

**BRITISH COLUMBIA  
MINISTRY OF FORESTS**

**Mid Coast  
Timber Supply Area**

**Rationale for  
Allowable Annual Cut (AAC)  
Determination**

**Effective June 1, 2000**

**Larry Pedersen  
Chief Forester**

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## Objective of this Document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed as chief forester of British Columbia in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Mid Coast timber supply area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

## Description of the TSA

The Mid Coast TSA is situated on the central coast of British Columbia (BC) within the Vancouver Forest Region and covers approximately 2.2 million hectares. The TSA is part of the larger administrative unit known as the Mid Coast Forest District, covering approximately 3.2 million hectares, which is administered from the forest district office in Hagensborg in the Bella Coola Valley. The Mid Coast TSA extends from Cape Caution in the south to Sheep Passage in the north. It is bordered by the Kingcome TSA to the south, by Tweedsmuir Park to the east, and by the Fiordland Recreation Area, the Kitlope Heritage Conservancy Protected Area and Tree Farm Licence (TFL) 25 to the north.

The terrain in the Mid Coast TSA is variable and rugged. The 'outer coast' portion of the Mid Coast TSA, as defined in Figure A-1, page 85, of the Ministry of Forests' *Timber Supply Review: Mid Coast Timber Supply Area Analysis Report, June 1999*, consists primarily of numerous low-lying islands, together with outlying coastal mainland areas, all supporting forests of relatively low productivity. In the 'inner coast' portion, further inland, the terrain is extremely mountainous, with very productive forests in the valley bottoms and along the many steep sided inlets, and with a large proportion of non-forested (alpine and subalpine) areas and ice fields at higher elevations.

The forests of the Mid Coast TSA are dominated by hemlock-balsam (65 percent) and western redcedar (25 percent), with minor proportions (about 5 percent each) of Sitka spruce and Douglas-fir. About 819 000 hectares, or 37 percent of the area of the Mid Coast TSA, are considered productive forest, and currently a maximum of about 23 percent of that productive forest, or 8.6 percent of the total TSA, are considered available for harvesting.

Four biogeoclimatic zones are represented in the Mid Coast TSA. The Coastal Western Hemlock zone, the most productive forest ecosystem in Canada, covers about two-thirds of the TSA. Occurring at low-to-mid elevations, mainly west of the coastal mountains, this zone is characterized by high rainfall, cool summers and mild winters. Western hemlock is the most abundant tree species, followed by western redcedar. Douglas-fir is scattered throughout the region south of the Dean Channel. Sitka spruce, yellow-cedar, amabilis fir, mountain hemlock, shore pine, Douglas maple and red alder also occur.

The Mountain Hemlock zone is located above the Coastal Western Hemlock zone, at mid-to-upper elevations (900 to 1800 metres). This zone is characterized by short, cool summers and long, cool, wet winters with heavy snow cover for several months. Mountain hemlock, amabilis fir and yellow-cedar are the most common tree species. Other frequently-occurring species are western hemlock, western redcedar and Douglas-fir. Except at lower elevations, forests are not continuous in the Mountain Hemlock zone. With increasing elevation, the forest thins into parkland, with clumps of trees interspersed with alpine tundra.

The Engelmann Spruce-Subalpine Fir zone also has a limited distribution at higher elevations in the Mid Coast TSA, occurring along the eastern boundary of the TSA and within Tweedsmuir Park, adjacent to the TSA. This zone is characterized by cool, short summers and long, cold, snowy winters. Engelmann spruce, subalpine fir, amabilis fir and mountain hemlock are the most common tree species, but Douglas-fir also has a significant presence. As with the Mountain Hemlock zone, continuous forests occur at lower elevations and grade into parkland at higher elevations.

The Alpine Tundra zone occurs at high elevations above the Mountain Hemlock zone. This zone is treeless by definition, due to the cold, windy, snowy conditions, and the short, cool growing season. Vegetation is dominated by alpine heather, a dwarf evergreen shrub.

Due to its varied topography and climate, the Mid Coast TSA contains an abundance of terrestrial and marine wildlife, ranging from black-tail deer and grizzly, Kermode and black bears, to sea mammals and marine birds. Of particular importance are the old-growth forests of the Coastal Western Hemlock zone and the sheltered, nutrient-rich estuaries that provide critical habitat for over-wintering water birds, many species of mammals, and young salmonids acclimatizing in the mixed fresh and salt water. Concern over declining populations of the marbled murrelet in the province has prompted the provincial red-listing of this species, which is present in the Mid Coast TSA. The grizzly bear is also vulnerable to population declines and is blue-listed provincially. Current forest management practices follow the legislation and guidelines set out by the Forest Practices Code of British Columbia, ('the Code') and the protection of wildlife and the environment are managed through the Code.

The TSA's forests have also supported a rich and diverse cultural history. Archaeological work has revealed ten thousand years of human activity in the TSA; some of the oldest excavated materials date to the beginning of human use of the central coast, and include evidence of some of the oldest First Nations habitations on the BC coast. In more recent times, forest harvesting has supported generations of pioneers who logged with oxen, boats and railways. A pulp mill built early in the 20th century at Ocean Falls was the economic centre of the Mid Coast area for most of the century until its closure in the early 1980s. In the past few decades the forests of the TSA have supported small communities dependent on harvesting by more modern methods.

The Mid Coast TSA lies in one of the more remote and sparsely populated areas of the province. The main communities in the area are Bella Coola, and Waglisla (or Bella Bella) on Campbell Island. About one-half of the people in the Mid Coast TSA live in the Bella Coola Valley (including Hagensborg and Firvale), and about one-quarter live in Waglisla. The rest of the residents of the TSA live in isolated communities along the outer coast, such as Ocean Falls, Shearwater, Klemtu, Oweekeno, Dawsons Landing and Namu. A majority of the population in the TSA is comprised of First Nations people living in four communities; the Heiltsuk Nation at Waglisla, the Nuxalk Nation at Bella Coola, the Kitasoo/Xaixais Nation at Klemtu, and the Oweekeno Nation at the headwaters of Rivers Inlet. The Gwa'Sala-'Nakwaxda'xw have traditional lands located within the Mid Coast TSA but reside in Port Hardy, which is outside the TSA. Currently four of the First Nations with traditional territory within the TSA are involved in the BC Treaty Commission process. The Oweekeno, Heiltsuk, and Kitasoo (in affiliation with the Tsimshian Tribal Council) are currently at Stage 4, Negotiation of an Agreement-in-Principle, and the Gwa'Sala-'Nakwaxda'xw as a part of the Winalagalis Treaty Group are at Stage 2, preparing for negotiations. The Nuxalk Nation is not in the BC Treaty Process. To date, a small number of First Nations people have been involved in the forest industry within the Mid Coast TSA. This is slowly changing as more First Nations are establishing working relationships with licensees who

operate within their traditional territories, and are also obtaining some of their own forms of forest tenure.

All of the Mid Coast TSA is included in the Central Coast Land and Coastal Resource Management Planning process, which began in the summer of 1997 and is still underway. The plan covers a large portion of British Columbia's central coast (approximately 4.8 million hectares), extending from Princess Royal Island to Johnstone Strait. Since the early 1990s, the coast of BC including the Mid Coast TSA, has received international attention due to the presence there of large areas of undeveloped, globally rare coastal temperate rainforests. The future of these forests is an important issue in the ongoing land-use planning process. The Mid Coast TSA offers extraordinary opportunities for recreation and tourism including the world-renowned Inside Passage cruise ship route through which more than three-quarters-of-a-million visitors pass each year.

The TSA contains only one major timber processing facility, located in the Bella Coola valley; timber from the TSA supports processors located primarily on Vancouver Island, and in the Vancouver-Lower Mainland regions.

### **History of the AAC**

In the Mid 1970's, the AAC for the Rivers and Dean public sustained yield units, which now make up the Mid Coast TSA, was approximately 747 000 cubic metres. In 1978, the AAC was increased to 1 412 160 cubic metres, and three new timber sale harvesting licences were issued. In a timber supply review conducted from 1978 to 1980, the long-run sustained yield was determined to be 900 000 cubic metres per year. However, the harvest level was determined to meet existing quota agreements and was contingent upon harvesting in poorer quality stands and using new harvesting techniques. Effective January 1981, the AAC for the Mid Coast TSA was 1 400 000 cubic metres. This AAC was increased in 1986 and again in 1989, to 1 516 600 cubic metres. From 1989 to 1990 an Information Report and an Options Report were prepared for the TSA for AAC determination purposes. The AAC remained unchanged until 1992.

During 1989 and 1990, it was determined that Mid Coast TSA licensees were not harvesting sufficient volumes from the poorer quality stands. An operability review in 1991-92 resulted in a 39-percent reduction in the operable land base. As a consequence, and in consideration of other resource values, the AAC was reduced to 1 000 000 cubic metres, effective January 1, 1992. Of this AAC, a partition of 130 000 cubic metres was specified as attributable to height class three forest stands, i.e. trees over 120 years of age that had not reached 28.5 metres in height.

A timber supply analysis completed in 1993 for the 1994 AAC determination confirmed the 1992 decision, and the AAC was maintained at the 1992 level, effective January 1, 1995. This AAC was also partitioned, with 130 000 cubic metres specified as attributable to height class three stands on the outer coast, decadent hemlock-balsam stands outside current operability lines, and stands that are accessible by helicopter but are outside current operability lines.

On April 1, 1998, the apportionment of the AAC of 1 000 000 cubic metres for the Mid Coast TSA was as follows:

| Allowable Annual Cut  | cubic metres/yr  | percentage of AAC |
|---|------------------|-------------------|
| Forest Licences, replaceable                                    | 862 968          | 86.3              |
| Timber Sale Licences 10 000 m <sup>3</sup> or less, replaceable | 2 552            | 0.3               |
| Small Business Forest {- any category (Sec. 20)                 | 13 813           | 3.1               |
| Enterprise Program {- bid proposals (Sec. 21)                   | 74 917           | 5.7               |
| Forest Service Reserve  | 23 294           | 2.3               |
| Woodlot volume (now partially allocated*)                       | 4 912            | 0.5               |
| Forest Licences, non-replaceable                                | 17 544           | 1.8               |
| <b>Total AAC:</b>   | <b>1 000 000</b> | <b>100.0</b>      |

- \* (The separate administration, required by the *Forest Act*, for the one woodlot licence issued from this apportionment since April 1, 1998, is accounted for in this determination as discussed below, under *woodlot licences*.)

### New AAC determination

Effective June 1, 2000, the new AAC for the Mid Coast TSA will be 998 000 cubic metres, a reduction of 2000 cubic metres from the current AAC to account for the recent issuance of a woodlot licence. The new AAC volume thus excludes all volumes in issued woodlot licences, as required by the *Forest Act*.

Within the AAC of 998 000 cubic metres, a partition of 200 000 cubic metres is specified as attributable to hemlock-balsam stands on sites of poor and low productivity, as discussed below in 'Partitioned component of the AAC'.

In my determination I have made reference to two important factors related to outstanding land use issues in the area. These are integral to the determination and are recorded below, under the section 'Determination'.

This new AAC will remain in effect until a subsequent AAC is determined, which must take place within five years of the present determination.

### Information sources used in the AAC determination

- Forest Inventory Planning file, BCFS;
- Mid Coast TSA licensee Forest Development Plans;
- Major Licensee Silviculture Information System records, BCFS;
- *Mid Coast Timber Supply Area (TSA) Data Package and Information Report*, BCFS, April 1998;
- *Mid Coast TSA Analysis Report*, BCFS, June 1999;
- *Mid Coast TSA Timber Supply Analysis: Information Report*, October 23, 1999;
- *Mid Coast TSA Public Discussion Paper*, BCFS, June 1999;
- *Mid Coast TSA Summary of Public Input on Data Package and TSA Analysis Report* (draft) BCFS, October 1999;
- Operability mapping, 1997;
- *Mid Coast TSA Inventory Audit*, BCFS Resource Inventory Branch, 1995;
- *Working Paper 36/1998, Site Index Adjustments for Old-growth Stands based on Veteran Trees*, Nigh, G.D., BCFS Research Branch, 1998;
- *Working Paper 37/1998, Site Index Adjustments for Old-Growth Stands Based on Paired Plots*, Nussbaum, A.F., BCFS Research Branch, 1998;



- *Forest Practices Code Managing Identified Wildlife Guidebook*, 1999, Ministry of Environment, Lands and Parks (MELP) and BCFS;
- Letter from the Minister of Forests to the chief forester, dated July 28, 1994, stating the Crown's economic and social objectives for the province;
- Memorandum from the Minister of Forests to the chief forester, dated February 26, 1996, stating the Crown's economic and social objectives for the province regarding visual resources;
- Letter from the Deputy Ministers of Forests and Environment, Lands and Parks, dated August 25, 1997, conveying government's objectives regarding the achievement of acceptable impacts on timber supply from biodiversity management;
- *Mid Coast Timber Supply Analysis*, BCFS, May 1993;
- *Mid Coast TSA Rationale for AAC determination effective January 1, 1995*, BCFS, September, 1994;
- *Mid Coast TSA AAC, Apportionment and Commitment listing*, January 1, 1996, BCFS;
- *A Protected Areas Strategy for British Columbia, Provincial Overview Status Report*, April 1996, Land Use Coordination Office;
- *Community Watershed Guidebook*, B.C., October 1996;
- *Forest Practices Code Timber Supply Analysis*, BCFS and MELP, February 1996;
- *Forest Insect and Disease Impacts in Timber Supply Areas*, BCFS;
- *Mid Coast Timber Supply Area Report*, October 1980;
- *Socio-Economic Assessment of Timber Supply Scenarios: Mid Coast TSA*, G. E. Bridges and Associates, Victoria, March 1994;
- *Mid Coast Timber Supply Area Timber Supply Review Discussion Paper*, April 1994;
- Technical review and evaluation of current operating conditions through comprehensive discussions with staff of the BCFS, including a two-day field review of the TSA with senior district staff in July, 1999, and the AAC determination meeting held in Hagensborg, BC, October 27-29, 1999;
- *Forest Practices Code of British Columbia Guidebooks*, BCFS and MELP;
- *Landscape Unit Planning Guide*, BCFS and MELP, March 1999;
- *Higher Level Plans: Policy and Procedures*, BCFS and MELP, December 1996;
- *Riparian Management Area Guidebook*, BC, December 1995;
- *Biodiversity Guidebook*, Province of British Columbia (BC), September 1995;
- *Forest Practices Code of British Columbia Act*, July 1995;
- *Forest Practices Code of British Columbia Act Regulations and Amendments*, April 1995.

### **Role and limitations of the technical information used**

Section 8 of the *Forest Act* requires the chief forester to consider biophysical as well as social and economic information in AAC determinations. A timber supply analysis, and the inventory and growth and yield data used as inputs to the analysis, typically form the major body of technical information used in AAC determinations. Timber supply analyses and associated inventory information are concerned primarily with biophysical factors—such as the rate of timber growth and definition of the land base considered available for timber harvesting—and with management practices.

However, the analytical techniques used to assess timber supply are necessarily simplifications of the real world. There is uncertainty about many of the factors used as inputs to timber supply analysis due in part to variations in physical, biological and social conditions, although ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of this uncertainty.

Furthermore, technical analytical methods such as computer models cannot incorporate all of the social, cultural and economic factors that are relevant when making forest management decisions. Therefore, technical information and analysis do not necessarily provide complete answers or solutions to forest management problems such as AAC determinations. The information does, however, provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information required to be considered in AAC determinations.

In determining the AAC for the Mid Coast TSA, I have considered known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

### **Statutory framework**

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining AACs for timber supply areas and tree farm licences. Section 8 is reproduced in full as Appendix 1.

### **Guiding principles for AAC determinations**

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean that there is always some uncertainty in the information used in AAC determinations. In making a large number of determinations for many forest management units over extended periods of time, administrative fairness requires a reasonable degree of consistency of approach in incorporating these changes and uncertainty. To make my approach in these matters explicit, I have set out the following body of guiding principles. If in some specific circumstance it may be necessary to deviate from these principles, I will provide a detailed reasoning in the considerations that follow.

Two important ways of dealing with uncertainty are:

- (i) minimizing risk, in respect of which in making AAC determinations, I consider the uncertainty associated with the information before me, and attempt to assess the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and
- (ii) redetermining AACs frequently, to ensure they incorporate current information and knowledge—a principle that has been recognized in the legislated requirement to redetermine AACs every five years. The adoption of this principle is central to many of the guiding principles that follow.

In considering the various factors that Section 8 of the *Forest Act* requires me to take into account in determining AACs, I attempt to reflect as closely as possible operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect either to factors that could work to *increase* the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or to factors that could work to *reduce* the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the Forest Practices Code.

The *Forest Practices Code of British Columbia Regulations* were approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time. The *Forest Practices Code of British Columbia Act* was brought into force on June 15, 1995.

Although the Code is now fully implemented following the end of the transition period on June 15, 1997, the timber supply implications of some of its provisions, such as those for landscape-level biodiversity, still remain uncertain, particularly when considered in combination with other factors. In each AAC determination I take this uncertainty into account to the extent possible in context of the best available information.

As British Columbia progresses toward the completion of strategic land use plans, the eventual timber supply impacts associated with land-use decisions resulting from the various planning processes—including the Commission on Resources and Environment (CORE) process for regional plans, the Protected Areas Strategy, and Land and Resource Management Planning (LRMP) process—are often discussed in relation to current AAC determinations. Since the outcomes of these planning processes are subject to significant uncertainty before formal approval by government, it has been and continues to be my position that in determining AACs it would be inappropriate to attempt to speculate on the timber supply impacts that will eventually result from land-use decisions not yet taken by government. Thus I do not account for possible impacts of existing or anticipated recommendations made by such planning processes, nor do I attempt to anticipate any action the government could take in response to such recommendations.

Moreover, even where government has made a formal land-use decision, it may not always be possible to fully analyze and account for the consequent timber supply impacts in a current AAC determination. In many cases, government's land-use decision must be followed by a number of detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made it would be impossible to fully assess the overall impacts of the land-use decision. Nevertheless, the legislated requirement for five-year AAC reviews will ensure that future determinations address ongoing plan implementation decisions. However, where specific protected areas have been designated by legislation or by order in council, these areas are deducted from the timber harvesting land base and are no longer considered to contribute to the timber supply in AAC determinations.

The Mid Coast TSA lies entirely within the area currently under consideration by the Central Coast Land and Coastal Resources Management Plan (CCLCRMP) process. This process is expected to bring clarification to a number of aspects of land and resource use including decisions and designations for a number of new protected areas, as well as boundaries and resource management objectives and strategies for various zones. However, completion of the process is not expected until late 2000.

Forest Renewal BC funds a number of intensive silviculture activities that have the potential to affect timber supply, particularly in the long term. As with all components of my determinations, I require sound evidence before accounting for the effects of intensive silviculture on possible harvest levels. Nonetheless, I will consider information on the types and extent of planned and implemented practices as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of any timber supply effects of intensive silviculture.

Some have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete, but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to redetermine many outdated AACs between 1992 and 1996. In any case, the data and models available today are superior to those available in the past, and will undoubtedly provide for more reliable determinations.



Others have suggested that, in view of data uncertainties, I should immediately reduce some AACs in the interest of caution. However, any AAC determination I make must be the result of applying my judgement to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I may need to make allowances for risks that arise because of uncertainty.

With respect to First Nations' issues, I am aware of the Crown's legal obligations resulting from recent decisions in the Supreme Court of Canada. The AAC that I determine should not in any way be construed as limiting the Crown's obligations under these decisions, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the Mid Coast TSA. It is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply.

Overall, in making AAC determinations, I am mindful of my obligation as steward of the forest land of British Columbia, of the mandate of the Ministry of Forests as set out in Section 4 of the *Ministry of Forests Act*, and of my responsibilities under the *Forest Practices Code of British Columbia Act*.

### **The role of the timber supply analysis and reference forecast**

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me through the work of the Timber Supply Review program for TSAs and TFLs.

For each AAC determination for a TSA a timber supply analysis is carried out by BCFS staff using an information package including data and information from three categories—land base inventory, timber growth and yield, and management practices. Using this set of data and a computer model (FSSIM—'Forest Service Simulator'; in this case for the Mid Coast, 'version 3'), a series of timber supply forecasts is produced, reflecting different decline rates, starting harvest levels, and potential trade-offs between short- and long-term harvest levels.

From this range of forecasts, one is chosen which attempts to avoid excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. Often termed the 'base case', this serves as a reference forecast, and forms the basis for comparison when assessing the implications of uncertainty for timber supply.

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the reference forecast for a TSA is not an AAC recommendation. Rather, it is one possible forecast of timber supply, whose validity—as with all the other forecasts provided—depends on the validity of the data and assumptions incorporated into the computer simulation used to generate it.

Therefore, much of what follows in the considerations outlined below is an examination of the degree to which all the assumptions made in generating the reference forecast are realistic and current, and the degree to which the resulting predictions of timber supply must be adjusted, if necessary, to more properly reflect the current situation.

These adjustments are made on the basis of informed judgement, using current, available information about forest management, which may well have changed since the original information package was assembled. Forest management data is particularly subject to change

during periods of legislative or regulatory change, such as the enactment of the Forest Practices Code, or during the implementation of new policies, procedures, guidelines or plans.

Thus it is important to remember, in reviewing the considerations which lead to the AAC determination, that while the timber supply analysis with which I am provided is integral to those considerations, the AAC determination itself is not a calculation but a synthesis of judgement and analysis in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the reference forecast. Judgements that may be based in part on uncertain information are essentially qualitative in nature and, as such, are subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation may be gained by attempting a computer analysis of the combined considerations to confirm the exact AAC determined.

### Timber supply analysis and reference forecast for the Mid Coast TSA

The June, 1999 *Timber Supply Review Mid Coast Timber Supply Area Analysis Report* provided three main alternative projections for my consideration as possible reference forecasts, based on differing assumptions about the area that is suitable and available for timber harvesting. The first two of these, described below, show a significantly larger and more stable timber supply than that projected in the analysis completed in May 1993 for the previous timber supply review. This increase occurs despite additional management requirements for non-timber resources such as fisheries, water quality and biodiversity. The primary reason for the increase is the inclusion, in the timber harvesting land bases for the first two 1999 forecasts, of between 35 and 50 thousand hectares of outer coast areas and areas that are considered operable only by non-conventional harvesting techniques, that were not included in the 1993 analysis.

The first of the three 1999 forecasts, identified in the report as the "Initial" forecast, projected that a starting harvest level of one million cubic metres per year (the current AAC), could be maintained for 12 decades. The projected harvest level then declined by about 10 percent per decade over three decades to a steady long-term level of about 770 000 cubic metres per year. In this forecast, as shown in the analysis report, the outer coast and areas operable by non-conventional methods were assumed to make a large contribution to the overall rate of harvest in the near term. During the first fifty years, the average rate of harvest projected from non-conventional areas was 400 000 cubic metres per year, about 40 percent of the harvest. This is a considerably higher proportion than in current practice, and causes me concern with respect to this projection, as I have discussed below.

The second forecast, identified as the 'Revised operability' forecast, projected the same starting rate of one million cubic metres. This was maintained for eighty years (compared to 120 years in the 'Initial' forecast) before declining by 10 percent per decade over three decades to a steady long-term level of 730 000 cubic metres per year (40 000 cubic metres lower than in the 'Initial' forecast). This forecast was based on a timber harvesting land base reduced by about 16 000 hectares (7.8 percent) from that used in the 'initial' harvest forecast, after a detailed review of operability by Mid Coast Forest District staff and adjustments to better reflect current practice.

The third forecast, labelled 'Inner coast conventional operability', showed the result of projecting the timber supply based on the area harvestable by conventional systems in the inner coast area only, with no contribution from either non-conventional harvesting in otherwise inoperable areas, or from outer coast stands. The results of this forecast were (coincidentally, in view of many differences in assumptions) almost identical to those in the 1993 analysis used in the previous

timber supply review. This third forecast started at 870 000 cubic metres per year and declined after one decade to a steady long-term level of about 550 000 cubic metres per year.

As noted in the analysis report, due to changes in the mapped line defining the 'inner' and 'outer' coast areas, the inner coast conventional timber harvesting land base is now smaller than was estimated for the previous review (now 121 344 hectares, down from 155 580 hectares). However, revised management assumptions for some scenic areas and increased timber volume estimates for managed stands have compensated for the smaller timber harvesting land base, and the overall timber supply forecast for the inner coast area is essentially unchanged.

As also noted in the current analysis report, marginal stands on the outer coast and areas outside conventional operability were not included in the 1993 analysis because at that time the economic viability of these stands was uncertain and harvesting performance was sporadic. It was believed then that until continued harvesting performance in these stands could be assured, they should not be included in the analysis. To encourage harvesting performance, a component of 130 000 cubic metres per year, harvestable only from marginal stands not included in the timber supply analysis, was included in the January 1, 1995 AAC of one million cubic metres per year. This component was estimated (without benefit of a comprehensive timber supply analysis) as the steady long-term rate of harvest attributable to these marginal stands. In the 1999 analysis, the average steady long-term rate of harvest from outer coast and non-conventional harvesting areas was assessed at about 180 000 cubic metres per year.

Each of the three analyses identified above is described in more detail in the 1999 analysis report. In assessing which of the projections is most suitable for use as a reference forecast for use in this determination, I have carefully reviewed the assumptions applied in each case, and the implications of relying on them, particularly with respect to the operable land base and to contributions from stands of low productivity. My considerations related to this are set out below in the sections *physical and economic operability*, and *unmerchantable forest types and sites of low productivity*. For the reasons discussed in those sections, I have concluded as follows.

The 'Initial' forecast relies over the next several decades on a projected harvest rate from non-conventional harvesting—in areas otherwise considered inoperable—that is not consistent with current practice, and that I cannot consider at this time to be a reasonable extrapolation from current practice. It also relies on what I consider to be an unreasonably large contribution from sites of low and poor productivity. For these reasons I have excluded this projection from further consideration as a reference forecast.

In the 'Revised operability' forecast, the dependence on non-conventional harvesting is less than in the 'Initial' forecast, but the projection still assumes the current AAC can be maintained for several decades by relying in future operations on a significantly higher rate of non-conventional and outer-coast harvesting than is currently practiced. Without knowledge of future economic conditions, the assumed ongoing viability of the elevated levels of non-conventional and outer-coast operations in this projection is uncertain, and incurs a risk of overestimation in the projection. I have concluded that this risk, which increases as the assumed rate of non-conventional operations increases, is still too high to permit my use of this projection as a reliable reference forecast.

On the other hand, I have considered the third forecast, the 'Inner coast conventional operability', which assumes no contribution at all from non-conventional areas or from outer coast areas, to be an overly conservative estimate of operability. A balance to this was provided in the 1999 analysis report by a forecast showing the results of directly adding to this projection, throughout the forecast period, a timber supply contribution from non-conventional areas and outer coast stands,

limited to what these areas are estimated to be capable of producing as a steady long-term level. I consider this version to be the most realistic of the published projections. However, this version shows the total harvest as the direct sum of the contributions from the component areas discussed here when they are projected separately, as isolated areas. To ensure that the effects of all forest cover adjacency interactions between the component harvest areas are appropriately accounted for, I requested that the analyst project the supply as an *integrated* forecast from all the areas in combination, rather than as the sum of their separately added contributions.

The resulting integrated projection incorporated steady contributions of 59 000 cubic metres per year from outer coast stands, and 178 000 cubic metres per year from non-conventional areas otherwise currently considered inoperable. In this projection, with these 'marginal' areas and the inner coast conventional area analyzed together, a harvest level at the current AAC was maintained for two decades, followed by declines of roughly 10 percent in each of four subsequent decades, to a steady long-term level of 730 000 cubic metres per year.

I have considered this last projection, which models the adjacency interactions between the various component areas of the timber harvesting land base, to be the most suitable reference forecast for use in assessing the timber supply in the Mid Coast TSA for the purpose of determining this AAC. For convenience, in this document, from this point onward I have referred to this forecast as The 'Preferred reference' forecast. My assessments of the validity of the assumptions incorporated in this forecast, and other factors required to be considered under section 8 of the Forest Act, are included in the following sections.

## **Consideration of factors as required by section 8 of the *Forest Act***

### **Section 8 (8)**

In determining an allowable annual cut under this section the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

- (a) the rate of timber production that may be sustained on the area, taking into account
  - (i) the composition of the forest and its expected rate of growth on the area

### Land base contributing to timber harvest

#### *- general comments*

The total area of the Mid Coast TSA, as estimated from BCFS inventory data updated to December 1996 and reported in the June 1999 timber supply analysis, is 2 211 930 hectares. Of the total TSA area, 819 436 hectares (less than 50 percent) are productive Crown forest land.

In defining the timber harvesting land base for a TSA, (i.e. the area estimated to be economically and biologically available for harvesting), a series of deductions is made from the total area of the productive forest. These deductions account for factors that effectively reduce the suitability or availability of the productive forest for economic, ecological or social (e.g. parks) reasons. In timber supply analysis, assumptions, and if necessary, projections, must be made about these factors, prior to quantifying appropriate areas to be deducted from the productive forest, in order to derive the timber harvesting land base.

In the Mid Coast TSA, deductions were made from the productive forest to account for numerous factors including inoperable areas, sensitive soils, areas of low productivity, riparian reserves,



roads, trails and landings, and others. The deducted areas are detailed in the analysis report, and summarized in Table 2 of the report.

As noted above in Timber supply analysis and reference forecast for the Mid Coast TSA, and discussed further below, in *physical and economic operability*, assessing where operations will be feasible and economic in the Mid Coast TSA—a large and remote area of very complex terrain—is subject to much uncertainty. This is particularly true for outer coast areas and areas operable by non-conventional methods. In the analysis, in an attempt to encompass the range of this uncertainty, three separate sets of deductions were made, incorporating significantly different assumptions about the operable land base, and resulting in the considerable differences, noted above, in the respective timber supply projections.

The sizes of the three long-term timber harvesting land bases derived for the Mid Coast TSA using these differing deductions for inoperability were 206 227 hectares ('Initial' analysis), 190 425 hectares ('Revised operability'), and 121 344 hectares (inner coast conventional *only*). This last figure is 20 percent smaller than the figure of 155 580 hectares derived for the 1993 analysis, which also included no contribution from outer coast or non-conventional areas. This difference is due to a number of changes, including the mapping of the line defining the inner and outer coast areas, greater reductions for riparian and low-productivity areas, and others. The timber supply forecasts based on these two similar but not identical land bases are therefore not directly comparable. (In the 'Preferred reference' forecast referred to in the section above, the timber harvesting land base is the same size as in the 'Revised operability' forecast, but the included 'marginal' areas are in each case assumed to be harvested at a different rate.)

Significant deductions from the productive forest—including those for inoperability—that were applied in deriving the timber harvesting land base for the 1999 analysis for the Mid Coast TSA, are discussed immediately below, with the exception of riparian reserves, which are discussed along with riparian management zones and other implications that may be expected from use of the area for purposes other than timber production, under Integrated resource management objectives.

#### *- physical and economic operability*

Those portions of the TSA which are not physically accessible for harvesting, or which are not feasible to harvest economically, are excluded in the derivation of the timber harvesting land base.

The boundary for the division referred to above, between the "inner" and "outer" coast areas in the TSA, runs roughly along the wet hypermaritime subzone of the Coastal Western Hemlock Biogeoclimatic Zone, with some modifications suggested by major licensees and the Small Business Forest Enterprise Program (SBFEP) operating in the area. Two very significant factors in this determination are the extents to which harvesting can reasonably be expected to be economically feasible in this outer coast area and in areas operable only by non-conventional methods. Although the 1992 AAC for the Mid Coast TSA included a 130 000-cubic metre partition to provide for harvesting in these areas, no contribution from them was assumed in the 1993 analysis report since at that time sufficient performance had not been demonstrated. In the 1995 AAC determination, to continue to provide an opportunity to demonstrate such performance, a partition of 130 000 cubic metres, attributable only to selected timber types in the outer coast and to high elevation areas above the conventionally operable areas, was again included in the AAC.

A review of licensee performance over the years 1992 to 1998 shows that almost 15 percent of the AAC for the Mid Coast TSA has been harvested from the forest types and areas as specified in the 1995 partition. Since the partition represents only 13 percent of the total AAC, this has provided adequate evidence of the physical and economic feasibility of an ongoing contribution to the AAC

from these types and areas. I have considered the assessment of a reasonable and appropriate contribution from these types and areas to be central to this AAC determination.

Operability for the whole TSA was reviewed, with participation by licensees and the SBFEP, in 1997-98. From this review the following is of note. Some large areas that were previously outside the operability line, but where operations were either occurring or planned, were included as *conventionally operable*. *Non-conventional harvesting* outside the newly mapped operability lines was included for stands of over 500 cubic metres per hectare (this figure having been chosen as a benchmark from a review of 33 cutting permits harvested over the past 3 years, and from comparisons to 158 proposed blocks) where these stands were within approximately 2 kilometres of a water or land drop area.

Non-conventional areas, for the purpose of the current analysis, represent areas outside conventional operability lines, that may be harvested by any number of harvest methods, including, but not limited to, helicopters. As discussed further below, it is very difficult to define operability over such a large, variable and complex area as encompassed by this TSA, with any degree of precision. This type of mapping exercise must therefore be viewed as representing a reasonable approximation of operability and logging chance for the purpose of supporting this determination, but at the same time it is acknowledged that site-specific operational activities may be at variance with the mapping, on a 'plus-and-minus' basis. In other words, some areas within the lines may not actually be operable, and conversely, some areas outside the lines may be operable by conventional means or by helicopter. Thus operability as defined for the analysis does not define the ultimate harvest method.

In *outer coast* areas, only stands of over 425 cubic metres per hectare were included, and only if their concentration and situation were considered to provide a viable harvesting opportunity. The resulting combination of areas assessed in this review as operable or potentially operable by conventional systems, by non-conventional systems, and in outer coast areas, was used in deriving the timber harvesting land base of 206 227 hectares used in projecting the 'Initial' timber supply forecast.

In a subsequent detailed review of maps it was considered that some of the areas included for non-conventional harvesting were in fact not feasible. In recognition of the high dependence of operability by non-conventional systems upon economic circumstances, adjustments were then made to the assessed operability, with some previously included areas now being excluded and vice versa, based on local knowledge of specific areas and information from operational plans. The net result of these detailed adjustments was that a further approximately 15 000 hectares were excluded. Part of this reduction was the removal of the entire 4160-hectare Smokehouse/Long Lake drainage. Notice had been given to licensees in 1995 that this area would be removed if no interest was expressed in harvesting there. No interest was expressed, and consistent with engineering field reviews of physical accessibility, the area was removed. Other adjustments included recognition of areas that were not economically accessible by non-conventional systems today—due to completion of first-pass harvesting and associated road deactivation—but could become so when harvested in future in conjunction with conventionally harvestable regenerated stands. In the analysis, such areas were assumed to become harvestable only after a 50-year deferral. In all study areas listed in the *Revised Study Areas for the Central Coast LRMP Area* (May 1997), harvesting was assumed to be deferred for 10 years. The timber harvesting land base of 190 425 hectares derived after all these adjustments was used in projecting the 'Revised operability' forecast, and also formed the basis for the 'Preferred reference' projection.

Licensees expressed some concerns before the analysis was undertaken—for example, regarding the need to include all species in non-conventional harvesting—as a result of which adjustments were made to more accurately represent current practice in the analysis. One licensee still maintains that consideration should have been made in the analysis for harvesting non-conventionally down to 400 cubic metres per hectare for hemlock-balsam stands, and 375 cubic metres per hectare for cedar and cypress stands. I accept that licensees do in some instances operate in stands with these lower volumes. However, from reviewing records of the timber volumes logged by helicopter for stands with varying volumes per hectare, I conclude that the frequency of harvesting in these lower-volume stands is much lower than in stands of 500 cubic metres or more per hectare. Moreover, in the field, some stands of over 500 cubic metres per hectare are found to be not harvestable. Overall, I am satisfied that the 500-cubic-metre figure represents a suitable means of describing the average delineation between the harvestable and non-harvestable land bases, for analysis purposes. (This figure represents an average volume; in practice individual stands with a lower volume that are considered to be outside the harvestable land base may be harvested. Such stands do not represent underestimations in the timber supply, because the average nature of the figure also means that some stands with lower volumes are likely to have been included in areas classed as harvestable, when they will not be harvested. Thus all stands harvested in the TSA, including any that may be harvested outside the timber harvesting land base, are considered to contribute to the AAC.)

From all this, with the following qualifications, I am satisfied that the methodology used in deriving the operability assessments has resulted in a generally adequate representation, in the analysis, of the physical limitations on harvesting in the TSA. I do have one specific concern regarding physical operability, discussed in the next paragraph, and other more general, but very serious concerns, discussed in following paragraphs, arising from the assumed levels of contribution from non-conventional and outer coast areas used in the 'Initial' and 'Revised operability' forecasts which are highly dependent on economic conditions that are often beyond the control of licensees.

First, in aerial reconnaissance with the district manager, the operations manager, the district planning officer, and the timber supply analyst for the area, I reviewed carefully the level of correspondence between the operability assumptions in the analysis and the nature of specific areas of the varied terrain in the TSA. In general this correspondence appeared sound. In one notable instance, however, our consensus was that three drainages in the Dean Channel area—Jump Across, Swallow and Nusash creeks—which had been assumed to be conventionally operable in the analysis, on physical inspection did not appear accessible by road for harvesting. We considered the terrain at the mouth of the drainages to consist of rocky outcrops too uneven to permit access for harvesting except for a short distance by helicopter. Our consensus was that most of this area should not have been included in the operable area of the TSA, and as I have noted below, in my determination I have assumed no contribution from this area.

My other noted concern is with the high contributions to timber supply assumed to come from non-conventional areas outside the conventional operability line, in both the 'Initial' and 'Revised operability' projections. I have no doubt that the rigour of the methodology applied has ensured that on average all the areas represented as operable in these two analyses meet the applied criteria for physical operability. However, while it is reasonable to consider these 'unconventional' areas as physically operable, I do not consider it reasonable to assume, as is required in the 'Initial' timber supply projection, that their contribution will increase to provide roughly half the timber supply in the TSA for a continuous period of several decades. I do accept that in recent years the costs of helicopter harvesting have been reduced in response to higher demand. However, the viability of this form of harvesting will continue to depend on an economic climate that is

unpredictable and subject to considerable variation. The current contribution from non-conventional stands forms less than 15 percent of the harvest, while the 'initial' projection assumes that a contribution of 40 percent or more will be sustained over the next several decades. At this time I cannot consider such a significant departure from current practice to be a reliable expectation.

Moreover, as I have noted above in Timber supply analysis and reference forecast for the Mid Coast TSA, while in the 'Revised operability' forecast the dependence on non-conventional harvesting is less than in the 'Initial' forecast, the projection still relies on a significantly higher level of harvest by these means in future operations than is currently practiced. In the sixth decade of this forecast, non-conventional operations comprise over 60 percent of the harvest. In my judgement, this assumed ongoing viability of elevated levels of economically dependent, non-conventional operations during future periods of economic uncertainty incurs a risk of overestimation in the timber supply. I have concluded that this risk, which increases as the assumed level of non-conventional operations increases, is still too high to permit my use of this projection as a reliable reference forecast.

For these reasons, and as discussed in Timber supply analysis and reference forecast for the Mid Coast TSA, I have concluded that operability in the TSA is more appropriately represented by the conventionally harvestable areas of the inner coast, combined with contributions from non-conventional areas outside the conventionally operable area and from the outer coast that are limited to levels that can be sustained over the long term. These assumptions are the basis for the 'Preferred reference' forecast which projects the timber supply from the integrated component land bases, and is used as a basis for my considerations in this determination. The combined size of the timber harvesting land base for this projection was 190 425 hectares, the same as in the 'Revised operability' forecast, but with a different assumed rate of harvest from the outer coast and non-conventional land bases.

To examine the sensitivity of the 'Preferred reference' forecast to changes in the operability of non-conventional sites, the timber supply was projected with the area assumed to be operable by these means first reduced, and then in a separate analysis, increased, by fifty percent. The results were that the projected 2-decade maintenance of the starting harvest level of one million cubic metres was in the first case, reduced, and in the second case increased, by one decade. I conclude from these results that the extent of the operability by non-conventional systems in the TSA may be subjected to considerable variation in response to changing economic conditions without affecting the projected starting harvest level.

In public input, an environmental group suggested that a lack of spatial capability in the analysis can lead to overestimates in the accessibility and economic viability of harvesting. As noted above, viability with respect to the concentration and situation of stands was a required condition for operability.

As discussed, I have noted from assessments during personal aerial reconnaissance, corroborated by the Mid Coast Forest District Manager and senior staff, that the operable area assumed in this timber supply projection should be reduced by something less than 3500 hectares, to reflect the restriction of the accessibility of the three identified drainages to small amounts of helicopter harvesting. I have taken this into account in my determination, as noted in "Reasons for Decision". With this exception, and noting the cautions expressed above with respect to alternative forecasts, I am satisfied that the 'Preferred reference' forecast, on which I have chosen to rely in this determination, is based on a suitable representation of the harvestable areas in the TSA.



*- unmerchantable forest types, including sites with low timber productivity*

Some growing sites in the Mid Coast TSA, particularly on inner-coast valley bottoms, are highly productive, but in relation to these sites, the majority of the remaining mature forest on the timber harvesting land base is of lower productivity, due to high elevation, steep terrain with thin soils, or poor drainage in outer coast areas. Forest stands on sites of low productivity which have not reached 425 cubic metres per hectare and are not considered capable of reaching this volume by 150 years of age, were considered on this basis alone to be unmerchantable. The harvesting of forest stands on sites of low productivity is highly dependent on economics, and the assessment of the extent to which stands of this nature should be included in the timber harvesting land base from which the AAC is determined, and the rate at which harvesting should be assumed to take place, are complex and subject to uncertainty.

In the TSA, hemlock-balsam stands occupy 181 732 hectares of poor-productivity sites, and 256 174 hectares of low-productivity sites. Of these, 5184 hectares and 54 972 hectares respectively, for a total of 60 156 hectares, were included in deriving the timber harvesting land base for the analysis, after all exclusions and deletions. Stands with a previous logging history were included in the land base, regardless of their site productivity or current volume.

Much consideration was given to the criteria for including the low-productivity hemlock-balsam stands, which are typically of pulp quality, in the timber harvesting land base. Since some of these stands have been harvested previously, it was assumed they would continue to contribute to harvest levels in suitable market conditions. In public input, one licensee with experience in harvesting the lower quality stands in the TSA agreed with a conservative assessment of their contribution to the harvest. The Central Coast Regional District suggested better information is needed before determining a harvest level for the marginal stands on the outer coast, otherwise the harvest could exhaust the desirable cedar and compromise the viability of harvesting the species profile. An environmental organization recommended that the contribution from marginal sites be limited to the level sustainable over the long term, which is consistent with my findings, as discussed below.

In assessing the extent to which sites of poor and low productivity—primarily 'decadent' hemlock-balsam stands—can appropriately contribute to the harvest, now and in the future, I have reasoned as follows.

The roughly 60 000 hectares of these stands cover approximately one-third of the 190 425-hectare timber harvesting land base. From 1992 to 1998, the volumes harvested from these stands represent roughly 3.5 percent of the annual harvest—only about one-tenth of the proportion in which they occur on the timber harvesting land base. This is partly to be expected, as the recoverable volumes per hectare on poorer quality sites are lower than the average for the whole timber harvesting land base. However, these disparate proportions are still a cause for concern. In the 'Initial' timber supply forecast, maintenance of the current AAC for 12 decades was predicated on a very large proportion (up to 95 percent in some periods) of the harvest coming from sites of poor and low productivity over the next 50 to 80 years. As noted earlier in Timber supply analysis and reference forecast for the Mid Coast TSA, this high dependence on marginal stands was a major contributing factor in my rejection of that forecast as a reference forecast for this determination.

In the 'Revised operability' forecast, low-productivity stands are still required to contribute at a much higher rate than at present, which could affect the overall economic viability of the mix of harvested species and types.

In the 'Preferred reference' forecast, the assumed contribution from low-productivity hemlock-balsam stands is set at the level that can be sustained over the long term, and is thus considerably lower than in the other projections. As noted above, due to their lower average recoverable volumes per hectare, it is not reasonable that these stands should contribute in direct proportion to their representation by area on the timber harvesting land base. However, even the lower level of use assumed in the 'Preferred reference' forecast is considerably higher than their historic and recent level of use, and there is currently no adequate indication of an increase in harvest rate toward the assumed level. Without a significant increase in the use of marginal stands, the overall viability of the timber supply projection will become questionable. It is therefore mandatory for some increased level of development in these stands to be demonstrated over the period of the next business cycle.

A sensitivity analysis was carried out on the 'Preferred reference' forecast in which the area in the timber harvesting land base covered by the poorest sites for each species ('poor-site' fir and spruce and 'low-site' hemlock and cedar) was increased and decreased by one third (i.e. by 11 000 hectares). The result was that the maintenance of the starting level increased or decreased respectively by one decade, and the long-term level increased or decreased respectively by 3.5 percent. When *half* the hemlock-balsam stands in all age classes on poor and low sites (about 26 000 hectares) were excluded from the timber harvesting land base, the starting level of one million cubic metres could still be met for one decade, but the long-term level was reduced by nearly 10 percent from 730 000 to 660 000 cubic metres.

From this sensitivity analysis I conclude that there is considerable flexibility in the 'Preferred reference' forecast to accommodate variation in the assumed contribution from marginally economic stands. Nevertheless, in view of the dependence of the overall harvest level on their use, I am concerned that performance in these stands should be closely monitored. In the past, these stands have been developed primarily during good market periods. Their economic viability may have been higher when harvested in conjunction with better quality stands than when harvested on their own, which may soon be the case more often, to meet higher levels of use.

In view of the potential risk to the future projected economically available timber supply if these stands are not harvested in the short term when their economic availability is supported by combination with the harvest of more valuable stands, I have decided to establish a partitioned component of the harvest attributable solely to these stands, as discussed below in Partitioned component of the harvest. If adequate performance is not demonstrated over the effective period of this determination, their contribution to the timber supply in the TSA will have to be seriously reconsidered in the next analysis and AAC determination.

In conclusion, for the current determination, while I am satisfied that the criteria used for low-productivity sites and unmerchantable forest are adequate, I am concerned that these forest types may not be used to the extent assumed in the analysis. I have taken this into account as the possibility of up to a 30-percent potential overestimation in the timber harvesting land base used in the 'Preferred reference' forecast, due to undemonstrated performance in the low-productivity hemlock-balsam stands, as discussed in 'Reasons for Decision', and I have established a partitioned component of the AAC specifically requiring their use.

#### *- environmentally sensitive areas*

An environmentally sensitive area (ESA) is an area identified during a forest inventory that is sensitive to disturbance (such as unstable terrain, or areas that are difficult to reforest) and/or is significantly valuable for fisheries, wildlife, water or recreation resources. ESA values are used to

exclude areas from the timber harvesting land base where more specific and detailed information is not available about a particular forest resource. Areas can be identified as either very sensitive (E1) or moderately sensitive (E2) to disturbance, and are either entirely or partially removed from the timber harvesting land base, according to their level of sensitivity.

In deriving the timber harvesting land base for the Mid Coast TSA timber supply analysis, 16 204 hectares or two percent of the productive forest were excluded to account for ESAs. Exclusions for sensitive soils were based on detailed operational information from original inventory work for the TSA done in the early 1970s. Terrain stability assessments have been completed at the drainage level for some areas where operations are occurring or planned, as required by the *Forest Practices Code of BC Act* and Regulations, but not for the whole TSA.

The exclusions applied for various sensitivities were as follows. Areas with highly unstable soils (Es1) were 90-percent excluded; moderately unstable soils (Es2), 40 percent; avalanche areas (Ea1), 100 percent; and areas with regeneration problems (Ep1), 100 percent. Land base exclusions were not applied for wildlife areas; instead the necessary restrictions were applied through forest cover constraints. This is discussed below, together with the views expressed by MELP staff, under Integrated resource management objectives.

In public input, one licensee noted that a number of its helicopter cutblocks have been in Es1 and Es2 areas (sensitive soils), and recommended that the Es1 exclusion of 90 percent should be reduced for areas operable by helicopter. The company recommended doing a study to verify the Es exclusion levels, noting that a similar study to provide a more accurate estimate of potential slope stability in the same licensee's TFL had resulted in a reduction in the Es2 exclusion from 40 percent to 10 percent. Another licensee expressed concern about exclusions for steep slopes, since much of their helicopter volume comes from these areas, and that the 90-percent exclusion underestimates the land base available for non-conventional logging.

Mid Coast Forest District staff respond that the level of demonstrated performance in this regard is not high and actual harvesting to date on areas with sensitive soils in the TSA has been limited. BCFS staff consider the percentage exclusions applied in the analysis to be appropriate, since detailed Terrain Stability Assessments often identify areas within the timber harvesting land base that were not excluded but which have sensitive soils and will not be harvested.

From this I accept that some helicopter harvesting has doubtless occurred on sensitive soils, but I have insufficient evidence to validate this as current practice for all sensitive areas, particularly since this part of the coast is in general a difficult area for operations. As a rule, Es1 areas often increase in response to detailed mapping, and in the absence of detailed terrain stability mapping, a 90-percent exclusion is a reasonable, average procedure. Ten percent of the sensitive area is included, which substantiates the licensees' demonstrated operations to date. In general, ESAs are based on broad, overview assessments. Until detailed mapping is carried out it is reasonable to assume some harvesting will take place on the included 10 percent of sensitive areas, and that some other areas assumed to be harvestable may in fact be identified as too sensitive and become excluded. With respect to the TFL study, it should not be assumed that similar results would necessarily be obtained in the TSA, as it would not be appropriate to extrapolate from one management unit to another.

I am advised that licensees carry out terrain assessments on most cutblocks, and frequently exclude some area as a result. Such assessments however do not identify sensitive areas outside the cutblocks, and this contributes to a lack of information for strategic development of the area. Obtaining this information is important to a better understanding of the implications of sensitive areas for timber supply. I therefore encourage both licensees and district staff to do everything

possible to gain the knowledge necessary to reduce the uncertainties and concern expressed in this public input. However, for the above reasons I am satisfied that for this determination the assumptions applied in the analysis are based on a reasonable methodology and represent the best available information. In any case, sensitivity analysis indicates that the timber supply in the TSA is not sensitive to changes in the size of the timber harvesting land base of the magnitude contemplated here.

With respect to areas that are sensitive for wildlife management, I note that in broad overview only 659 hectares were identified as Ew1 and 183 hectares as Ew2, for a total of 842 hectares. The potentially negative environmental implications that could be inferred from the relatively small size of this area are misleading, since in fact restrictive forest cover requirements for wildlife habitat were applied to much larger areas, as discussed below in Integrated resource management objectives.

*- deciduous stands*

In the Mid Coast TSA, stands of predominantly broad-leaf deciduous forest types have not generally been harvested, and in the timber supply analysis, all such stands were excluded from the timber harvesting land base. Deciduous volumes harvested within coniferous-leading stands are charged to licence AACs and are considered to contribute to the timber supply. One prospective licensee has recently expressed an interest in harvesting some red alder in the Mid Coast TSA, to determine the feasibility of such a harvest in the Mid Coast area.

Forest stands between the ages of 35 and 70 years with over 49 percent alder and more than 150 cubic metres per hectare of alder volume occupy approximately 1100 hectares in the TSA. District staff advise that few, if any, of the TSA's alder leading stands would currently be economic to harvest without incorporating a coniferous component. Many of the alder stands have cracking or staining from wind or frost that is not evident until sampling or felling, and many have valuable coniferous understories. A map review of all predominantly deciduous polygons larger than 9 hectares showed that 53 percent (582 hectares) of these polygons are in riparian areas. This review also included an additional area of less than 49 percent alder, in South Bentinck Arm (to include the area in which the licensee has expressed interest) for a total of 1310 hectares.

This would indicate that after riparian exclusions, less than 600 ha would be available for alder harvest. This figure would be subject to further exclusions for poor quality alder and for protection of the coniferous understory. District staff are currently working with the prospective licensee to advertise a deciduous sale in South Bentinck Arm. I understand the sale is anticipated to be advertised by March, 2000, as part of the SBFEP Section 20, and that the volume will come from Forest Licence undercut volumes.

Since current management does not include the harvest of predominantly deciduous stands, their exclusion from the timber harvesting land base in the analysis was appropriate. I acknowledge the interest expressed in developing some deciduous-based economic activity in the TSA, which at this time I expect can be accommodated within the currently projected declining harvest levels. From the information before me, I do not anticipate that this development will proceed on a scale that would require immediate recognition of a significant additional contribution from these stands to the overall timber supply of the TSA. If trials are successful, and significant volumes are realized in response to an intensified interest, this can be appropriately reflected in the next timber supply analysis.



*- roads, trails and landings*

During timber supply analysis, a percentage of the productive forest otherwise considered available for harvesting is excluded to account for the construction of logging roads, trails and landings.

*Existing roads:* In the timber supply analysis, a deduction of 15 354 hectares was made from stands potentially contributing to the timber harvesting land base to account for existing roads, trails and landings. This represents 7 percent of the area of all stands in age classes 1 to 4 inclusive (i.e. stands considered to have already been logged), and is consistent with district practice prior to 1996, as all disturbance in excess of 7 percent was rehabilitated.

*Future roads:* In the timber supply analysis, an area reduction of 7.6 percent (which has been permissible practice in the TSA since 1996) was applied to all stands in age classes 5 to 9 to account for future roads, trails and landings. The 7.6-percent figure was based on a sample of 236 blocks harvested recently by conventional systems and by helicopter, as obtained from the Major Licensee Silviculture Information System (MLSIS) forest cover database from December 15, 1995. One licensee feels the 7.6 percent reduction is too high and cites a BCFS research report conclusion that due to canopy closure, the productivity loss from roads is, on average, one half of site degradation. The licensee also contends the 7.6-percent reduction does not account for the increasing amount of helicopter logging, and recommends a reduction factor of 4 percent.

In response, the conclusion reached in the BCFS report was not an average for coastal situations, but rather was the result of applying one particular hypothetical scenario in a modelling exercise. In various locations and under varying conditions of road width, berm height, soil type, etc., trees may be expected to exhibit a range of degrees and rates of canopy closure, resulting in a range of impacts to productivity from road construction. It would be inappropriate to select the sample cited as typical of all roads and terrain types in the Mid Coast TSA. The 7.6-percent figure was obtained from operational data, and before any other figure could be substituted with confidence I would need to see detailed supporting data from suitable locations. I note that the sample of blocks from which the 7.6 percent figure was derived did include blocks harvested by helicopter.

It is possible that reductions for future roads may prove to be smaller with significant increases in helicopter harvesting. On the other hand, while changes in the Forest Practices Code allow licensees to propose either permanent or temporary access, only permanent access is currently being proposed in the TSA. Until more detailed information suggests otherwise, I will accept the 7.6-percent reduction as the best available information and as suitable for use in this determination.

*- woodlot licences*

The *Forest Act* requires AACs determined for TSAs to be exclusive of the areas and timber volumes allocated to woodlot licences. Thus, when woodlot licences are issued in a TSA, the required volumes are first allocated from an appropriate apportionment under the AAC for the TSA. Then, in the next AAC determination for the TSA, the TSA land base is reduced by the area of Crown land in all the woodlot licences issued since the previous determination, and the total volume in the issued woodlot licences is excluded from contributing to the AAC for the TSA.

In the Mid Coast TSA, one woodlot licence (No. 1863) was issued in 1998, subsequent to the previous AAC determination. The licence has an AAC of 2000 cubic metres, occupies

360 hectares of Crown land, and is located in the Nusatsum Drainage. The area involved was not excluded from the timber harvesting land base used in the 1999 analysis. The associated reductions in timber volume and area from the TSA must now be accounted for in this determination.

In my determination, I have accounted for a reduction in volume of 2000 cubic metres associated with the removal of 360 hectares from the timber harvesting land base, as noted in "Reasons for Decision".

*- timber licence reversions*

Timber licences (TLs) are old tenure arrangements that give a licensee exclusive rights to harvest merchantable timber within the licence area, subject to applicable legislation. Once these areas have been harvested and reforested, all future harvesting rights revert to the Crown and future harvests from the area will then contribute to the harvest for the TSA which contains the timber licence area.

In the analysis, it was assumed that all areas within TLs that have already been harvested (i.e. are covered by stands less than 100 years old) contribute immediately to timber supply for the TSA, whether or not a formal reversion to the TSA has been reflected in the forest inventory.

Approximately 13 000 hectares in TLs in the TSA remain to be harvested. In the analysis, it was assumed that harvesting will occur as quickly as possible in these areas, within the limitations imposed by forest cover constraints. Since these constraints were found to prevent the harvesting of all the TLs before their expiry dates, a harvest target of 600 hectares per year was set in the analysis for the TL areas, and as much time as necessary was allowed for the areas to be harvested. This target ensured that the TLs would be harvested first as permitted by forest cover requirements, rather than being subject to random selection as otherwise assumed in the model. In the analysis, these conditions resulted in most of the TL area being harvested within the first 10 years. However, the forest cover requirements prevented portions of some TLs from being harvested for up to 50 years.

From consultations with district staff I am satisfied that the assumptions as modelled adequately reflect current and anticipated rates of harvesting in the timber licence areas remaining in the TSA.

Existing forest inventory

*- current inventory*

The inventory used as a basis for the timber supply analysis for the Mid Coast TSA was originally prepared in 1988-1990 from 1977-79 photography, and has been updated to December 1996 for disturbances such as harvesting and fire, and projected for forest stand characteristics, growth and age-class, to January 1998.

An inventory audit for the Mid Coast TSA was carried out in 1994, and published in 1995, the results of which indicated that the forest cover inventory was reliable for strategic planning purposes. I have discussed this further under *volume estimates for existing natural stands*.

I am satisfied that the existing inventory on which the timber supply analysis was based represents the best available information and is adequate for use in this determination.

### *- age-class composition*

About two-thirds of the productive forest in the Mid Coast TSA is old-growth forest (over 240 years old). Much of this lies outside the timber harvesting land base and, while not contributing directly to the timber supply, provides desired stand conditions including old-forest attributes and permits seral stage requirements to be met with minimal constraint on forest stands within the timber harvesting land base. A large proportion of the requirements for old-forest attributes within each landscape unit in the TSA is met by areas of older forest that are excluded from the timber harvesting land base.

Due to the relatively short history of harvesting in the Mid Coast, most of the forest in the timber harvesting land base is older than 120 years, and there is very little second-growth forest nearing readiness for harvesting. In the 'Revised operability' timber supply forecast, the harvest for the first 70 years would be provided by existing old forests, with a subsequent transition to almost complete reliance on managed, second-growth stands in 100 years' time. In the 'Preferred reference' forecast, upon which my assessment of the timber supply is based, the long-term harvest level is reached earlier, after just 50 years, and consequently dependence on second-growth forests is deferred even further. Second-growth forests provide the majority of the harvest after about the first 75 years, but a significant proportion of the harvest is projected to come from natural stands for roughly 160 years.

From my understanding of timber supply analysis and my discussions with the analyst, I am satisfied that the current and evolving age-class composition in the Mid Coast TSA has been adequately incorporated and accounted for in the 'Preferred reference' projection. In my determination I have been mindful of the distribution of ages of the forest stands both in and outside the timber harvesting land base.

### *- species profile*

The forest inventory for the Mid Coast TSA shows that the timber harvesting land base is comprised primarily (66 percent) of stands composed predominantly of western hemlock and amabilis fir (balsam). The balance is comprised of stands of predominantly cedar (24 percent), Douglas-fir (5 percent) and Sitka spruce (5 percent). The correlation between the percentage of the timber harvesting land base covered and the volume harvested by species, derived from harvest billing data for the past seven years, is summarised in the following table:

| Species   | hemlock/balsam | cedar | Douglas-fir | spruce |
|---|----------------|-------|-------------|--------|
| Percentage of timber harvesting land base covered by each species | 66             | 24    | 5           | 5      |
| Percentage of harvest   | 53             | 34    | 7           | 6      |

In public input, the Central Coast Regional District (CCRD) expressed concern that past harvesting has concentrated on large stands of the preferred species of fir, spruce, cedar on the best growing sites. The CCRD says the species mix has been eroded by this past concentration and now the predominant species are hemlock-balsam—of which 25 to 30 percent is pulp quality—and old-growth cedar. The CCRD states that the market for pulp and hemlock has collapsed in the Mid Coast, leaving cedar, which the CCRD says comprises about 35 percent of TSA forests, as the preferred species. The CCRD is worried that if cedar is targeted for harvest over the next 5 years,

the end result will be forests comprised 90 percent of hemlock-balsam, with constantly changing market conditions and no solid marketing plan in place for pulp or hemlock-balsam wood products. The CCRD says a scenario is needed to identify the best uses and benefits from the TSA forests for the local community, for the province, and for the world, without continuing to erode the current species mix.

In response, the table above, which was compiled from actual billing records, does show a higher percentage of harvested cedar volume relative to the representative proportion of cedar-leading stands on the land base. Since the bulk of the timber harvesting land base is comprised of hemlock-balsam stands over 120 years old, and since the harvesting of these stands is highly dependent on market conditions, some of these may not be of a high enough quality for short-term use. In some market conditions, it is therefore reasonable to expect that hemlock-balsam stands would be underharvested relative to their proportion on the land base, while other species (fir, spruce, and cedar) would be harvested above their representation levels. In itself I would consider this to be a pragmatic and temporary economic response, which, unless continued indefinitely, would not represent a significant risk to the sustainability of the projected harvest rates.

However, I am advised that the cedar component continues to be harvested at proportionally elevated levels even in good market periods. It is rarely harvested below its representation, and this has not occurred in the past seven years, as shown in the following table:

| Species | Percentage of contributing land base | percentage of actual TSA harvest 1992-98 |      |      |      |      |      |      |
|---------|--------------------------------------|--|------|------|------|------|------|------|
|         |                                      | 1992                                     | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 |
| Cedar   | 24                                   | 28                                       | 32   | 25   | 35   | 35   | 41   | 47   |
| Hem-bal | 66                                   | 57                                       | 57   | 60   | 50   | 53   | 49   | 44   |

This shows a definite trend that must be monitored, and if harvesting over the next five years continues to reflect a proportional cedar component elevated from that in the inventory, any timber supply implications will be accounted for in the next determination.

As noted above in *unmerchantable forest types, including sites with low timber productivity*, I am also concerned for the representation of hemlock-balsam stands by site productivity, and I have addressed this further in Partitioned component of the harvest and in 'Reasons for Decision'.

*- volume estimates for existing natural stands*

The Variable Density Yield Prediction (VDYP) model version 6.4a, developed and supported by the BCFS' Resources Inventory Branch, was used to estimate timber volumes for existing natural stands for the 1999 timber supply analysis for the Mid Coast TSA. In the previous AAC determination, district staff had expressed concern over possible overestimation in the natural stand volumes. However, in an inventory audit completed for the Mid Coast TSA in 1994, the results for the mature component suggested that the inventory is statistically acceptable. Subsequent analysis of post-stratified data showed similar levels of acceptability in both the operable and inoperable forest areas (based on 9 and 40 samples respectively).



District staff now advise that from recent operational experience, inventory volumes on the outer coast appear to be underestimated to some degree, due to an overestimation of losses to decay, waste and breakage primarily for cedar species. They also feel the opposite to be true for inner coast stands, i.e. that volumes there may be overestimated, due to the poor quality of the older 'decadent' hemlock-balsam stands.

To assess the implications of possible error in these estimates with respect to the 'Preferred reference' forecast, I have relied on sensitivity analyses carried out on the 'Revised operability' forecast (the two projections are based on the same timber harvesting land base, with specific components assumed to be harvested at different rates) and on discussions with the timber supply analyst. In the 'Revised operability' forecast, when the timber volume estimates for existing natural stands were increased by 10 percent, the larger existing inventory allowed the starting harvest level to be maintained for an additional two decades before declining to the unchanged long-term level. When the estimates were instead decreased by 10 percent, the starting harvest level could only be maintained for three decades less than in the 'Revised operability' forecast.

From this, the timber supply forecast appears to be quite sensitive to overestimation in the volume estimates for existing natural stands. Due to the relatively small number of audit samples in operable areas, it is not possible to confirm or refute with statistical validity the current findings of district staff for particular areas of the TSA as noted above. However, since one of these cases implies an overestimation and the other an underestimation, I consider it very unlikely that the combined effects of the two errors, if they exist, would add up to a difference sufficient to reduce the timber supply by more than the two decades at the starting level shown in the 'Preferred reference' forecast.

I am satisfied that the timber supply analysis has used the best available inventory information and growth and yield predictions. Moreover, the audit results have validated the inventory values for the TSA overall as reliable for strategic planning purposes. I therefore accept the volume estimates for existing natural stands as used in the 'Preferred reference' forecast as satisfactory for use in this determination.

Nevertheless, I am concerned that the specific identified uncertainties in these estimates should be resolved as soon as possible. As noted below under 'Implementation', if funding permits, a second phase of the inventory audit should be carried out, with emphasis on collecting data to resolve questions about the volume estimates for existing natural stands for the operable land base in the inner and outer coast areas.

#### Expected rate of growth

##### *- estimates for site productivity and regenerated stand volumes*

Inventory data includes estimates of site productivity for each forest stand, expressed in terms of a site index. The site index is based on the stand's height as a function of its age. The productivity of a site largely determines how quickly trees grow. This in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced in regenerated stands, and the ages at which a stand will satisfy mature forest cover requirements and reach a merchantable size.

In general, in BC, site indices determined from younger stands (i.e. less than 31 years old), and older stands (i.e. over 150 years old) may not accurately reflect potential site productivity. In young stands, growth often depends as much on recent weather, stocking density and competition from other vegetation, as it does on site quality. In old stands, which have not been subject to

management of stocking density, the trees used to measure site productivity may have grown under intense competition or may have been damaged, and therefore may not reflect the true growing potential of the site. This has been verified in several areas of the province where studies—known as the old-growth site index or OGSi project—suggest that actual site indices may be higher than those indicated by existing data from mature forests. In recent years it has been concluded consistently from such studies that site productivity has generally been underestimated; managed forest stands tend to grow faster than projected by inventory-based site index estimates from mature and old-growth stands.

For the Mid Coast TSA timber supply analysis, the Table Interpolation Program for Stand Yields (TIPSY) was used to estimate timber volumes for managed coniferous stands. These tables were used for cedar stands 10 years old or younger, for Douglas-fir, hemlock and balsam stands 16 years old or younger, and for all stands that will be harvested in the future.

The standard provincial operational adjustment factors (OAFs) were applied to adjust the potential yields generated from TIPSY to reflect actual volumes under operational conditions. The factors are 15 percent for OAF 1 (a reduction to represent incomplete site occupancy, or small gaps in a stand), and 5 percent for OAF 2 (a reduction to represent losses such as decay that increase with the age of forest stands).

A sensitivity analysis carried out on the 'Revised operability' forecast indicated that increasing or decreasing managed stand yield estimates by 20 percent (without changing site index values that could possibly lead to other effects) had no effect on the short term harvest level, but did increase or decrease the long-term level by 20 percent. I am advised by the timber supply analyst that a similar sensitivity would apply to the 'Preferred reference' forecast, which is based on the same land base.

Another sensitivity analysis indicated that the timber supply forecast is significantly affected by changes in old growth site indices (OGSI). Applying the OGSi adjustment equations in *Working Paper # 36/1998, Site Index Adjustments for Old-Growth Stands Based on Veteran Trees*, Nigh, Gordon D., BCFS Research Branch, 1998, produced an 11-metre (68-percent) increase in site index in the old-growth hemlock-leading stands that make up 58 percent of the timber harvesting land base. Six-to-seven-metre increases were obtained for sites supporting other leading species in the TSA. With these increased site indices applied to the 'Revised operability' forecast, a starting harvest level of 1.2 million cubic metres, 20 percent higher than the current AAC, could be maintained in perpetuity. I am advised that applying these adjustments to the 'Preferred Reference' forecast, in which the same overall timber harvesting land base is assumed, would result in a similar projected long-term level of about 1.2 million cubic metres. However, because in this projection smaller volumes of outer coast and non-conventional harvest are assumed in the short term, the OGSi adjustments would initially apply to fewer stands, resulting in a 'ramping up' over time to the long-term level rather than a 'flat-line' projection.

One further factor potentially affecting the volume estimates for regenerated stands is the use of genetically improved seed. 'Class A' genetically improved seed (i.e. collected and bred from trees in the same biogeoclimatic zone that excel in chosen characteristics) is used for roughly 37 percent of the western redcedar trees planted in the TSA. Western redcedar stands make up 24 percent of the timber harvesting land base. Thus 8.8 percent of the planted trees are from Class A seed. A 10-percent gain in productivity from this seed would lead to a 0.88-percent gain at the TSA level, which was not taken into account in the Mid Coast timber supply analysis. Class A seed is not available for planting in this TSA for any other species.

In public input, the CCRD expressed a need for caution regarding higher second-growth volume projections, while a licensee stated that the large amount of existing old growth dictates that the OGSi-adjusted site indices should be used in the base case. I have addressed OGSi issues below.

The CCRD also expressed concern that the long-term harvest level is based on flawed assumptions including a lack of commitment to silviculture beyond 'free-to-grow' status that would render modelling assumptions that were based on best site conditions inaccurate. In fact in the analysis only basic silviculture was assumed (planting or natural regeneration, and basic spacing which is required in excessively dense stands and is not considered incremental) so no overestimation was present on this account. The CCRD also considered that young, second-growth forests will not become targeted for harvest as they will not be economically feasible to log by helicopter, or sufficiently merchantable to justify reactivation of roads. In response, from my own field visits I agree with district staff that although there is only a very limited second-growth harvest in the district at this time, the existing regeneration already shows the second-growth forests will be of a sufficiently high volume for helicopter harvesting or reactivation of roads to be feasible.

Also in public input, a licensee suggested that since planting has been underway in the TSA since the mid 1970s, managed stand yield tables should be applied to Douglas fir (age classes 1 and 2), hemlock-balsam (age class 1), and cedar (age class 1). However the use of these tables would be valid only if density control had been implemented throughout this period, in addition to planting. I am advised that for the most part this is not the case in the TSA.

The most significant implication for timber supply considered in this section results from the OGSi adjustments. The sensitivity analysis showed a potential for a very large increase in harvest level throughout the forecast period. However, in assessing the validity of this forecast as projected, considerable caution is required for the following reasons. First, only limited research into old growth site indices has been carried out directly within the Mid Coast TSA itself. For this reason, consistent with BCFS policy for management units throughout the province, the OGSi adjustments were examined in a sensitivity analysis rather than being incorporated into any of the reference forecasts. Second, the adjustments incorporated in the sensitivity analysis were based on correction equations derived in the working paper by Nigh noted above. This report cautions that the adjustment equations it derives should not be applied to site indexes outside the range sampled for each species, and for which data therefore exists, as this could produce unreliable results. However, in the current case, adjustments were inadvertently applied to 29 000 hectares of stands with site indices lower than the range sampled. Moreover, in the report, the adjustment equations for balsam and cedar were based on relatively small data sets, which adds uncertainty to the applicability of the adjustments. Finally, as the report also cautions with emphasis, the adjustments in the report correspond to *potential* productivity. Not all stands will achieve the potential indicated in the report, which assumes the elimination in large part of factors hindering tree growth, such as pests and competing vegetation.

Prior to this determination, I spent two days examining various aspects of the TSA by air and on the ground. From my first-hand review of the regeneration, even on shallow soils in the outer coast, I am impressed by the rates of new growth and I consider it very likely that an increase in productivity estimates for sites currently occupied by old growth is warranted. However, I consider it less likely that an adjustment of 11 metres is warranted for all strata for hemlock, as results from applying the standard equations from the report. For some species on some sites (e.g. poor site and low site hemlock) the yield increases indicated by the adjustments are in excess of 200 percent. I must consider the extensive applicability of such large increases as unproven at this time.

I have no doubt that when appropriate OGSI adjustments are applied, the timber supply in the Mid Coast TSA will prove to be significantly more stable than projected in the 'Preferred reference' forecast. In view of the associated potential benefits for the management of all resources in the area, there is an urgency to clarify the applicability of these adjustments. In view of the several cautions expressed above, and of the fact that application of the adjustments to the 'Preferred reference' forecast rather than to the 'Revised operability' forecast would likely produce a lower projected initial harvest level, I do not consider that the existing sensitivity analysis provides a reliable indication of the magnitude of the potential benefits. I therefore urge district staff to pursue the necessary funding to carry out the studies within the TSA that are required to quantify appropriate OGSI adjustments for incorporation in future timber supply analyses.

For this determination, as noted in 'Reasons for decision' I have accepted the possibility of a large addition to the projected supply from future revisions to OGSI estimates, as well as the 0.88-percent gain in the longer term from the use of Class A seed.

- *minimum harvestable ages*

A minimum harvestable age is an estimate of the earliest age at which a forest stand has grown or will grow to a harvestable condition. The minimum harvestable age assumption mainly affects when second growth will be available for harvest. This in turn affects how quickly existing stands may be harvested such that a stable flow of harvestable timber may be maintained.

For the Mid Coast TSA analysis, the minimum harvestable ages for stands in each analysis unit were assumed to be the greater of a) the estimated age at which the stand will reach a merchantable volume of 350 cubic metres per hectare, or b) the age at which the 250 largest-diameter trees in the stand will achieve a prescribed minimum mean diameter at breast height (dbh). This diameter was 45 centimetres for cedar on all sites, and 35 centimetres for all other species and sites. In most cases the volume criterion was the overriding factor, except for cedar for which a 45-centimetre-dbh stem was assumed necessary for acceptable wood quality. The resulting assumed minimum harvestable ages ranged from 45 years for spruce on good sites to 240 years for cedar on sites of low productivity. (For the outer coast, as noted above in *physical and economic operability*, no stands were assumed to be harvested before reaching 425 cubic metres per hectare.)

In public input, a licensee recommended that the minimum harvestable age for all species should be the age at which the growth rate is estimated to reach 95 percent of the maximum annual growth rate (culmination of mean annual increment, MAI), consistent with the approach in the Fraser, So0, and North Coast TSAs, with piece size being only a secondary objective. While it is true that other areas have used varying criteria to define minimum harvestable ages, I consider that the approach used here is not unreasonable for this TSA in which, given the notably uncertain climate for economic operability, it is reasonable to seek to produce logs of a higher volume and value than may be achieved at a specified percentage of MAI.

The CCRD suggested a culmination age of 40 years would not be workable as it would require maximum silviculture applications while the Mid Coast TSA is not a high priority for incremental silviculture. This is consistent with the assumptions in the analysis, as the lowest assumed minimum harvestable age was 45 years for spruce on good sites (a very small part of the timber harvesting land base), while minimum harvestable ages of 90 years or greater were assumed for most combinations of species and sites.



A sensitivity analysis based on the 'Preferred reference' forecast showed that if all minimum harvestable ages were increased by 20 percent, the current AAC could be maintained for only one decade instead of two, and the steady long-term level was reduced slightly.

District staff advise me that the minimum harvestable ages assumed in the analysis are consistent with current management. Therefore, and since the current AAC could still be met for a decade if the age of readiness for harvesting of all species on all sites were delayed by 20 years, I conclude there is no risk in accepting the minimum harvestable ages assumed in the analysis for use in this determination.

- (ii) the expected time that it will take the forest to become re-established on the area following denudation:

#### Regeneration delay

Regeneration delay is the elapsed time between the harvesting of an area and when it becomes occupied by a specified minimum number of acceptable, well-spaced seedlings. In the timber supply analysis, prompt reforestation was assumed with regeneration delays ranging from 2 to 4 years: 2 years on fir and cedar sites of good and medium productivity; 3 years on fir and cedar sites of poor productivity, hemlock and balsam sites of good and medium productivity, and all spruce sites; and 4 years on hemlock and balsam sites of poor productivity.

In public input one licensee suggested that the regeneration delay for stands of hemlock-balsam on sites of good and medium productivity should be reduced from 3 to 2 years since those sites will be 100-percent planted. District staff are concerned that this would not account for the time taken in replanting failed plantations, for the ingress of other species or for other operationally experienced impediments to reforestation (see next section for discussion). In my experience it would seem reasonable to assume that the early planting of all sites—particularly as prescribed to deal with problematic brush-prone sites—could lead to regeneration delays in the one- to two-year range, and I would encourage all such efforts to reduce regeneration delays. However, I am advised that the timber supply forecast is not sensitive to increasing or decreasing the assumed regeneration delay periods by up to three years. Therefore, while there may be some uncertainty as to the exact length of some delay periods, I am satisfied that the assumptions made in the analysis are generally adequate for use in this determination.

#### Impediments to prompt regeneration

Potential impediments to prompt reforestation in the Mid Coast TSA include brush problems, colluvial sites, root rot in the drier transition areas in the Bella Coola Valley and, to a limited extent, the Sitka-spruce weevil.

Brush problems were accounted for in the analysis through regeneration delay periods. Because public opposition to herbicides prevents their use in many areas, manual brushing is carried out promptly on brush-prone sites. Colluvial sites that are classified as having regeneration problems were excluded from the timber harvesting land base for the analysis. Some harvesting has occurred on colluvial sites but reforestation is difficult depending on slope and aspect. Stocking standards have been reduced on many of these sites, based on the stocking in the original stand. Root rot surveys and trials have been conducted in areas of the TSA where root rot is prevalent. The spacing of some stands prior to knowing the extent of root disease may have an impact on the final composition and stocking of these stands. However, due to the relatively high number of

stems left under the spacing standards in effect at the time of treatment, most stands with a high incidence of root rot are still found to be fully stocked, even with a high degree of mortality. Treatment for the Sitka-spruce weevil in the TSA has been by replanting those areas prone to weevil attack with alternative species. This is reflected in the analysis. The zone where weevil attack is expected has been expanding and some areas previously thought to be too cold or too high in elevation are now being attacked. Large areas of spruce plantations in the TSA which are now free of the weevil could experience significant impacts if the weevil were to establish there.

From this I conclude that management strategies, including early planting of problematic sites as noted in the previous section, are in place to deal with the several known impediments to regeneration in the TSA. In view of the potential implications for regeneration delay, I again strongly encourage the prompt reforestation of all difficult sites. Licensees and district staff are aware of, and are working to deal with, these problems, and I am satisfied that the identified impediments are accounted for adequately by the information incorporated in the analysis.

#### Not-satisfactorily-restocked areas

Not-satisfactorily-restocked (NSR) areas are those where timber has been removed, either by harvesting or by natural causes, and a stand of suitable forest species and stocking has yet to be established. Areas where the standard regeneration delay has not yet elapsed since harvesting are considered "current" NSR. Where a suitable stand has not been regenerated and the site was harvested prior to 1987, the classification is "backlog" NSR.

The current Mid Coast TSA forest inventory file, updated to the end of 1996, identifies a total of almost 12 000 hectares as NSR land. However, the integrated silviculture information system (ISIS) and the major licensee silviculture information system (MLSIS) summaries, which are more up-to-date, identify only 4946 hectares of NSR land remaining to be restocked over the next ten years. In the timber supply analysis, the difference of 6943 hectares was assumed to have already been restocked and was assigned to the age group of 1 to 10 years. About 1500 to 2000 hectares are harvested in the TSA each year and, after accounting for the resulting area still within the normal two-to-four-year regeneration delay period, which is expected to be satisfactorily stocked when the accepted period has elapsed, very little NSR remains as backlog.

I am therefore satisfied that a productive forest is becoming re-established within an acceptable time on the available and suitable land in the TSA and will contribute appropriately to the timber supply.

#### **(iii) silvicultural treatments to be applied to the area:**

##### Silvicultural systems

Timber harvesting in the Mid Coast TSA is primarily by clearcutting, and by clearcutting with reserves. The area expected to be harvested using selection harvesting systems is not anticipated to be a large proportion of the TSA. These systems are therefore not represented in the timber supply analysis, in which all harvesting was assumed to be by clearcutting.

However, licensees in the Mid Coast area have begun to use variable retention systems, and this use is expected to increase in the future. One licensee in particular has indicated an intention to expand its use of non-clearcut systems. The cost-effectiveness of these forms of harvesting, the extent to which they will be implemented in the TSA, and the resulting implications for growth and yield estimates, cannot be determined at present. The BCFS Research Branch has undertaken

some work to examine potential productivity changes at varying levels of retention. However, due to the complexity of interacting variations in many factors—including distribution of retained cover, incident light through the forest canopy, changing shadow patterns, changes in moisture regimes, forest health conditions, and others—much work remains to be done before reliable predictions can be made about forest productivity under the various systems of partial retention.

It will be important to combine emerging productivity information with an assessment by district staff of the expected use of these systems, the extent of the areas affected, the amounts of expected retention, and the frequency of harvesting entries, for incorporation in the next timber supply analysis for the Mid Coast TSA. I have noted the need for this information in the 'Implementation' section below.

The unknown extent of the future application of these alternative systems introduces uncertainty to the timber supply as projected. At present it is not clear what types of alternative systems will be applied, nor is the extent of their intended application known at this time. In view of the associated uncertainty, any new developments in this situation should be reviewed regularly. With this caution, I am satisfied that for the purposes of this determination the timber supply analysis 'Preferred reference' projection adequately reflects the silvicultural systems *currently* in use in the TSA.

#### Incremental silviculture

In general, incremental silviculture includes activities, such as commercial thinning, juvenile spacing, pruning, fertilizing and genetic improvement, that are beyond the basic silviculture activities required to establish a free-growing forest stand.

In the Mid Coast TSA, incremental silviculture has been mainly limited to juvenile spacing and fertilizing, primarily on Douglas fir sites of good and medium productivity. Some pruning of the juvenile spaced stands has occurred but this does not affect the projected timber supply. High costs and limited funding have restricted the use of incremental silviculture in the central coast; in the past such activities have been carried out using funds from the federal-provincial Forest Resources Development Agreement (FRDA) or from Forest Renewal BC (FRBC), and have been conducted primarily on fir stands.

Due to the limited amount of incremental silviculture practiced historically and currently in the TSA, none was assumed in the analysis.

In public input, the CCRD stated that with no commitment to silviculture beyond the free-to-grow stage, modelling assumptions based on best site conditions are inaccurate. However, as noted above in *site productivity estimates and regenerated stand volumes*, only basic silviculture was assumed in the analysis, so no overestimation is present. The CCRD also stated that because FRBC funds are being managed by major licensees, top priority is likely to be given to industry's primary interests—i.e. the best sites with close access to current facilities and markets, (rather than strategic timber supplies for the TSA as a whole for the long term). While there may be some validity to this point I note that some incremental activities are also designed for areas close to lands in which First Nations have traditional interests—some spacing work has been carried out near Waglisla (Bella Bella)—and that some watershed restoration work has been done in various locations in the TSA including Rivers Inlet and Waglisla.

From my discussions with district staff I conclude that the generally low level of incremental silviculture in the TSA is primarily a consequence of its high cost and relatively low benefit. I am also satisfied that juvenile spacing is not practiced to an extent where yields would become

affected. Overall, I consider the assumption of incremental silviculture as applied in the analysis to be appropriately reflective of current practice.

*- commercial thinning*

In the Mid Coast TSA timber supply analysis, no volume was assumed to be harvested by commercial thinning. Historically, as noted above, some juvenile-spacing has been applied to Douglas-fir stands in the Bella Coola Valley and nearby. Some other species and areas have received limited stand tending, but the high costs of treating stands in this area have prohibited extensive treatment. If market conditions were to change, and the feasibility of harvesting small piece size material were to improve, commercial thinning could become a management option for some areas and species in the Mid Coast TSA. Any such changes will be taken into account in future timber supply analyses. For the current determination, the assumption in the 1999 analysis of no commercial thinning activity is appropriate.

- (iv) **the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area:**

Utilization standards

Utilization standards define the species, dimensions and quality of trees that must be harvested and removed from an area during harvesting operations. In the timber supply analysis, the regional standards were applied—a 17.5-centimetre diameter at breast height (dbh) for stands older than 140 years, 30-centimetre maximum stump height, and 10-centimetre minimum top diameter inside bark. While the criteria used in the analysis accurately reflect the regional utilization standards, the forest licence documents in the Mid Coast TSA incorporate a standard minimum top diameter of 15 centimetres. Resources Inventory Branch has assessed the resulting difference in yield as negligible, and I accept this as particularly true for the older forests in this TSA.

The CCRD commented that a mechanism to enforce proper utilization standards is required, otherwise waste billing will increase, as it will be cheaper to pay for waste than to attempt to utilize it. However, I note that all waste is applied to a licence AAC and accounted for so there would be no implication for the timber supply projection due to variations in utilization.

District staff monitor utilization in accordance with BCFS policy. Since the licensing practice results in only an insignificantly small overestimation in the projected timber supply and waste surveys are undertaken to account for underutilized volume, I accept that the utilization assumptions used in the timber supply analysis are reasonable for use in this determination.

Decay, waste and breakage

The VDYP model used to project volumes for natural stands incorporates estimates of the volumes of wood lost to decay, waste and breakage. Decay losses are built into the volume estimates, while standard waste and breakage factors are applied to the analysis in the development of VDYP yield curves. These estimates of losses have been developed for different areas of the province based on field samples. For regenerated stands, as previously discussed (see *estimates for site productivity and regenerated stand volumes*), the TIPS model incorporates OAFs that account for anticipated decay, waste and breakage. In the timber supply analysis for the Mid Coast TSA, the standard decay, waste and breakage criteria were applied.



As noted earlier in *volume estimates for existing natural stands*, from recent operational experience district staff consider that losses to decay, waste, and breakage may be *underestimated* in the *inner* coast transition areas, due to the poor quality of the older 'decadent' hemlock-balsam stands, and *overestimated*, primarily for cedar species, on the *outer* coast.

To date, no studies have been carried out to collect statistically valid data that would support varying the standard criteria for the TSA inventory as a whole for use in analysis. However, for inner coast areas, wood quality studies in two specific areas, the Machmell and the Kimsquit watersheds, do support the conclusion that the losses are underestimated; limited harvesting in these areas has consistently shown high levels of decay and lower volumes than indicated in the inventory. On the outer coast, some predominantly cedar stands have been harvested with volumes as much as 30-percent higher than indicated by cruise. Scaled volumes for the Small Business Forest Enterprise Program are consistently higher than the inventory or cruise volumes.

From detailed discussions with district staff I am satisfied there is strong evidence, both from BCFS and licensee sources, that the indicated over- and underestimations have been shown consistently in several years of operational experience. These findings appear to differ from the conclusion of reliability ascribed in the recent audit to the mature volume component of the inventory (see above, *current inventory* and *mature volumes for existing natural stands*). However, it is important to remember that the audit examined the inventory for the TSA as a whole, with relatively few samples in the timber harvesting land base, and that local variations may be expected. In any case, the audit volumes identify differences only in height, age and species, and use the same factors for decay, waste and breakage as were used to project the inventory volumes; thus the audit would not be expected to show 'errors' in these factors.

Without further sampling, the degrees of over- and underestimation are currently impossible to quantify with statistical validity, and in any case appear likely to be mutually offsetting with respect to the timber supply for the TSA as a whole. For this determination I therefore rely on the volume estimates as indicated in and projected from the TSA inventory file, and have made no adjustment to the assumptions for decay, waste and breakage applied in the analysis.

- (v) **the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production:**

#### Integrated resource management objectives

The Ministry of Forests is required under the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

- *cutblock adjacency, forest cover and green-up*

To manage for resources such as water quality, wildlife and aesthetics, and to avoid concentrating harvesting-related disturbance in particular areas, operational practices limit the size and shape of cutblocks and maximum disturbances (areas covered by stands of less than a specified height), and prescribe minimum green-up heights required for regeneration on harvested areas before adjacent areas may be harvested. Green-up requirements ensure maintenance of water quality, wildlife habitat, soil stability and aesthetics. Adjacency, green-up and forest cover objectives guide harvesting practices to provide for a distribution of harvested areas and retained forest cover in a variety of age classes across the landscape.

In the timber supply analysis for the Mid Coast TSA, forest cover requirements were applied specifying maximum or minimum permissible percentages of forest cover for various seral stages to model management for biodiversity, wildlife habitat, scenic values, community watersheds and cutblock adjacency. Each cover requirement was applied separately and accounted for all beneficial overlaps—in some cases one area of retained forest cover satisfied more than one objective, with up to five constraints being tracked simultaneously.

The cover constraint for cutblock adjacency was applied to the entire timber harvesting land base (as an underlying constraint, even if other constraints were applied to the same area) and permitted no more than 25 percent of each area to be in stands less than three metres tall. For visually sensitive areas, three differing constraints were applied as discussed below under *visually sensitive areas*. For community watersheds, a maximum of 5 percent of each area was permitted to be in stands younger than 5 years. For deer management areas, a minimum of 25 percent of the area was required to be in stands older than 250 years. For grizzly bear habitat, a minimum of 13 percent of the area was required to be in stands older than 250 years. Specific requirements were applied for landscape-level biodiversity. Management details for each of these values are discussed under the appropriate sections below.

In meeting the requirement for cutblock adjacency, it was assumed in consistency with operational experience that the average green-up height requirement of 3 metres could be met in about 15 years.

A sensitivity analysis was carried out on the 'Revised operability' forecast to examine the implications of reducing the permitted disturbance from 25 to 20 percent. In this analysis, which remains valid for the 'Preferred reference' forecast using the same land base, the initial and mid-term harvest levels were unaffected, the only change in the projection being a small disruption approximately 150 years from now. Relaxing the constraint to 30 percent had no effect on the forecast.

District staff advise that although the 25-percent permissible disturbance for adjacency is generally equivalent to a 'four-pass' harvesting regime over a system of several drainages, operationally each drainage is more likely to be harvested in two to three passes, with a longer time period between entries. I acknowledge that the number of harvest passes required operationally is difficult to predict with accuracy for specific areas. However, the assumption that the overall result is likely to average approximately four to five passes, or 20- to 25-percent retained cover for the TSA as a whole, as modelled by the various constraints in the analysis, is within a normal range for coastal areas and is acceptable for the following reasons. The detailed mapping of the constraints ensures full advantage is taken of opportunities to meet multiple objectives where possible. The sensitivity analysis showing that the adjacency constraint may be tightened without necessitating a harvest-level reduction, shows the timber supply is not directly constrained by the

adjacency requirement, and that some flexibility exists to meet changes in operational requirements if necessary. For these reasons I am satisfied that the adjacency cover constraint as modelled provides an adequate representation of the cutting patterns applied in the TSA at this time.

#### *- riparian habitat*

Riparian habitats occur along streams and around lakes and wetlands. The Forest Practices Code requires the establishment of riparian reserve zones that *exclude* timber harvesting, and riparian management zones that *restrict* timber harvesting, in order to protect riparian and aquatic habitats. Stream classes described in the *Riparian Management Area Guidebook* are determined, to estimate the area needed in riparian reserves and riparian management zones.

In the timber supply analysis for the Mid Coast TSA, 10 200 hectares (5.6 percent of the timber harvesting land base) were excluded to account for riparian reserve zones. For riparian management zones, a 4.2-percent reduction was applied to volume-over-age growth curves to reflect their partial availability for harvest. These figures were based on coastal average figures for stream length by stream class, estimated in a 1994 study completed by Wildstone Resources. In a study by MELP staff of one drainage in the TSA it was assumed that within the range of drainage patterns found in the TSA some would be substantially lower than the estimates in the 1994 study and some would be substantially higher. The MELP work confirmed the use of the coastal averages as acceptable for application in the TSA.

I am satisfied that, in the absence of specific local data, the estimates from the 1994 Wildstone study provide acceptable figures for use in identifying riparian requirements for coastal TSAs. A number of studies for coastal management units have shown that the Wildstone figures remain within an average range for these areas. Nevertheless, wherever possible, I prefer to rely on locally generated data for assessing requirements for riparian habitat. This helps to account more accurately for local variations in terrain and the 'lay of the land' which can affect the extent of reserved areas, and for variations in management within riparian management areas. Operationally, much of a riparian management zone may be left uncut, effectively forming an extension of the reserve zone. Conversely, if terrain configurations result in an effective addition to the reserve zone, this may in some cases be deemed as an extension to the management zone, and be partially subject to access for harvesting.

From detailed discussions with district staff and the timber supply analyst, I am satisfied that the complexities of tracking the age-classes of forest stands through retention and management in riparian habitat areas have been considered as fully as possible. I accept the land base exclusion and growth-curve adjustments as an adequate representation of the constraints on the projected timber supply that may be expected from the management of appropriate areas in the TSA for riparian habitat. I encourage district staff to continue to track actual experience with riparian management, to validate or refine the assumptions applied in future analyses.

#### *- community watersheds*

The Mid Coast TSA currently contains 5 areas, totalling 8979 hectares, that are officially designated under the Forest Practices Code as Community Watersheds. Only a very small proportion—348 hectares—of this area is operable forest land. Minor amounts of timber harvesting have taken place in these watersheds in the past.

To represent the management of community watersheds in the timber supply analysis, a forest cover constraint was applied whereby at any time a maximum of only 5 percent of each watershed

was permitted to be in stands younger than 5 years. The district manager has advised me that this constraint is reflective of planned and proposed levels of harvest in these watersheds. I am satisfied that the constraint imposed in the analysis adequately accounts for the equivalent clearcut area requirements of the Coastal Watershed Guidebook, and I note that given this approach, these areas contribute only minimally to the timber supply.

I am also advised of MELP's intention to designate more community watersheds in the TSA. These can be taken into account in the next timber supply analysis and AAC determination when the affected area is known and the designation is complete. These areas are expected to be small and to represent limited impacts to the timber harvesting land base, as with existing community watersheds. Even if the currently designated area were to be doubled, there would be minimal if any effect on the currently projected timber supply.

Particularly in view of the small areas involved, and the restrictive constraints applied, I am satisfied that the management objectives for the currently designated community watersheds have been adequately accounted for in the 'Preferred reference' timber supply projection.

*- visually sensitive areas*

Careful management of scenic areas visible from communities, public use areas and travel corridors is an important IRM objective. The Code enables the management of visual resources by providing for scenic areas to be identified and made known, and by providing for the establishment of visual quality objectives (VQOs). To achieve this, visual landscape inventories are carried out to identify, classify and record visually sensitive areas. On completion of such an inventory, a specialist may derive recommended visual quality classes (RVQCs, i.e.: 'Preservation'; 'Retention'; 'Partial retention'; 'Modification' or 'Maximum Modification' to identify levels of alteration that would be appropriate for particular areas. The Code requires these areas to be identified, by the district manager or in a higher level plan, and to be made known to licensees. When this has been done and an RVQC has become current practice, it may be incorporated into a timber supply analysis, preferably as a VQO established by the district manager or contained in a higher level plan. Established VQOs reflect the desired level of visual quality, based on the physical characteristics and social concern for an area, and seek to balance the perceptions and needs of people with the social and economic needs of the province.

To achieve VQOs, constraints are placed on timber harvesting, road building and other forest practices. The constraints, which are based on experience, research findings and public preferences, are expressed in terms of "forest cover" requirements that relate to the maximum percentage of a "viewshed" that may be harvested at any one time, and to 'visually effective green-up' (VEG)—the stage at which a stand of reforested timber is perceived by the public to be satisfactorily "greened-up" from a visual standpoint.

In the Mid Coast TSA, subsequent to the previous timber supply review, scenic areas have now been mapped, but the district manager has not yet established VQOs, pending direction from the CCLCRMP. Currently, scenic areas are mapped and made known as highly sensitive, moderately sensitive, or 'non-visible' (i.e. not visually sensitive). Highly sensitive scenic areas are managed consistent with RVQCs, and in response to the 1998 provincial strategy for visual quality management, the Mid Coast Forest District manages moderately sensitive scenic areas to the next least restrictive RVQC. 'Non-visible' areas are not subject to explicit management for visual values, but are subject at least to the standard adjacency constraint discussed above (in *cutblock adjacency, forest cover and green-up*) or to constraints for other objectives as applicable. District guidelines require up to a 6-metre green-up height in the visible areas of highly sensitive scenic areas.



In the timber supply analysis, forest cover requirements were applied to the various visually sensitive classes as follows.

| Group   | Forest cover requirement  |
|---|---|
| Cutblock adjacency  | Maximum 25 percent of the group may be in stands less than 3 metres tall      |
| Preservation and Retention RVQCs in highly sensitive areas (scenic class 1)   | Maximum 3 percent of the group area may be in stands less than 6 metres tall  |
| Partial Retention RVQC in highly sensitive areas (scenic class 1) or<br>Preservation or Retention RVQC in moderately sensitive areas (scenic class 2) | Maximum 10 percent of the group area may be in stands less than 6 metres tall |
| Modification RVQC in highly sensitive areas (scenic class 1) or<br>Partial Retention RVQC in moderately sensitive areas (scenic class 2)              | Maximum 20 percent of the group area may be in stands less than 6 metres tall |

RVQCs were modelled to the 'mid-point' of the allowable range of disturbance. Sensitivity analysis carried out on the 'Revised operability' forecast, which I am advised remains valid for the 'Preferred reference' forecast, shows that if RVQCs were in fact managed to the maximum allowed within the range, the projected timber supply would show only a slight increase in the steady long-term level. If the RVQCs were instead managed to the lowest disturbance allowed within their range, in this projection the starting harvest level would remain unchanged, but the timber supply would begin declining to the steady long term level 20 years earlier. I am advised and I agree that with the reduced rate of cut on the same land base in the 'Preferred reference' forecast, VQOs would likely have a less constraining effect.

In public input, a licensee suggested that the allowable disturbance should be modelled at the maximum permissible value within each range, i.e. 'Retention'—5 percent; 'Partial retention'—15 percent; 'Modification'—25 percent. It was further suggested that green-up heights should be adjusted by slope classification, i.e. 4 metres for a slope of less than 40 percent, and 6 metres for a slope greater than 40 percent, to take advantage of better growing sites on lower slopes and to improve the harvest flow. In response, I am advised by the district manager that the required green-up height will in any case vary with the topography, and that in some cases, where appropriate, the actual heights required operationally under current practice could be consistent with the licensee's suggestions.

From my detailed discussions with district staff and the timber supply analyst, I am satisfied that the analysis reflects scenic areas as they are currently declared and made known. Some changes may be expected from the CCLCRMP, but neither their substance, nor the form they may take—as advice to the district manager, or as binding components of a plan—may yet be predicted. I note that the current management regime takes account of the provincial strategy for visually sensitive areas. As acknowledged above, some natural variation is to be expected in green-up heights across a variety of slope classes. However, for the purpose of this determination, I consider that the analysis has accounted reasonably well for the timber supply impacts of managing for visual



sensitivity, and any refinements in green-up height can be considered in the next determination, along with any refinements in the total area to which they might apply—if the CLCRMP brings further information in this regard.

I therefore accept that the current management of visually sensitive areas has been adequately accounted for in the 'Preferred reference' forecast, which is therefore satisfactory for use in this determination in this respect.

#### *- recreation values*

Recreation areas such as campgrounds, trails, interpretive forests and lookout sites are identified in BCFS inventory files through feature significance and management class codes. For the Mid Coast TSA, five separate contractors were engaged to compile recreation inventory information over a period of seven years during which time the standards were continually changing. On the basis of the compiled information, in the timber supply analysis, areas managed solely for recreation values were excluded 100 percent from the timber harvesting land base, and areas which require special management to protect recreational values were 50-percent excluded. Areas with mapped recreation values that occur within mapped scenic areas were considered to be accounted for through visual resource management objectives.

This process resulted in an exclusion of 4236 hectares for lands with high to very high recreation values, and 5856 hectares for lands with moderate to high recreation value, for a total exclusion of 10 092 hectares of land. In reviewing the extent of this exclusion in comparison to the limited number of recreation trails and sites in the Mid Coast TSA, district staff subsequently concluded that for several reasons the process had led to the exclusion in the analysis of a considerably larger area for recreation purposes than would be expected from operational experience. Following a detailed examination of the areas and locations of recreation polygons indicated in the analysis as requiring special management for recreation, and discussions with regional staff, it was decided that approximately 9400 hectares had been excluded in error and should in fact be re-incorporated in the timber harvesting land base.

From reviewing the process in discussions with the BCFS staff involved, I am satisfied that several valid reasons exist to support this conclusion. It is common for recreation areas to overlap with riparian areas, grizzly bear habitat and non-forested areas, the exclusions for which in this analysis were not spatially defined. It is likely that this led to separate land base exclusions, where in fact the objectives for recreation, riparian habitat, and or grizzly habitat could often be met effectively by the same area of forest land. In addition to the overlapping areas, a large amount of recreation area occurs in scenic areas, primarily along the outer coast. Also, until integrated by the recent comprehensive review by BCFS staff, the inventory information collected by the five separate consultants could be subject to overlap and inconsistency. Finally, while recreation inventory information does indicate the presence of particular values at certain locations on the landscape, this does not necessarily imply that heavy forest cover constraints, or exclusions, will always be required to be applied operationally at each location. District staff have noted that some of the substantial land base removals, such as MacKenzie Park and some areas in the Kimsquit Valley for instance, were indeed legitimate, and I am satisfied that staff have objectively reviewed the appropriateness of the remaining exclusions to be applied. I am advised by district staff that the remaining roughly 700-hectare land base exclusion is an estimate that is directly attributable to moderate-to-high recreation values.

From these considerations I accept that the re-introduction of 9400 hectares to the timber harvesting land base will in no way diminish the recognition of legitimate recreation objectives in the TSA; rather this will serve to remedy errors in mapping and overlaps with other resource

constraints. In my determination, as noted in 'Reasons for Decision', I have therefore accounted for an underestimation of this size in the timber harvesting land base used as a basis for the 'Preferred reference' forecast. The CCLCRMP process will no doubt assist greatly in defining the extent of the recreation resource for the next analysis and AAC determination.

#### *- botanical forest products*

In the Mid Coast TSA, the picking and shipping of pine mushrooms is becoming an industry of significance, particularly on the eastern side of the TSA. Modifications were made to one forest development plan to accommodate concerns expressed by the pine mushroom industry. In view of the relatively high proportion of low-productivity sites in the timber harvesting land base, the frequency of conflict between mushroom picking and timber harvesting may be expected to increase. The conflicts do not currently occur in constant, identifiable areas that would indicate a need for land base exclusions. The CCLCRMP is expected to result in higher level direction for the management of pine mushrooms, prior to the next timber supply analysis. The activity is currently unregulated and generates no revenues directly to the Crown.

The CCRD submitted that timber supply should not be constrained to provide for the unregulated harvest of non-timber products that provide no revenue to the Crown. To date, these activities have not resulted in any restriction on the volume of timber harvested, and appropriately therefore no accounting for them was made in the analysis. In this determination I have not assumed any constraint on timber supply due to the harvesting of botanical forest products. Any significant implications resulting from the harvest of botanical forest products in the next five years will be accounted for in the next timber supply analysis.

#### *- cultural heritage resources*

As noted above in the 'Description of the TSA', the Gwa'Sala-'Nakwaxda'xw, Heiltsuk, Kitasoo, Nuxalk, and Oweekeno First Nations have identified traditional territories in the Mid Coast TSA. Cultural heritage resources are defined in the *Forest Act* and include archaeological sites, traditional use sites and objects such as culturally modified trees (CMTs). Archaeological sites and CMTs that predate 1846 are protected under the *Heritage Conservation Act*. The nature and extent of required protection of archaeological sites are detailed under this legislation.

An Archaeological Overview Assessment (AOA) completed for the central coast prior to preparation of the data package for the Mid Coast TSA analysis identified a total area of 33 700 hectares within the timber harvesting land base with a high or moderate potential for containing CMTs. To reflect the estimated impact on timber supply, in the analysis ten percent of the identified area, or 1.8 percent of the timber harvesting land base, was excluded from contributing to the timber supply. The ten-percent figure was derived from the average area reserved operationally in each cut block containing CMTs to protect individual CMTs (900 square metres) and the average number of CMTs located in each block (1.1 CMTs per hectare).

The Central Coast AOA reflected in the analysis has since been updated, and in the most recent study, the area identified by the predictive model for CMTs as of high or moderate potential for containing CMTs is significantly increased. However, experience on Vancouver Island indicates that CMTs are actually found in only 24 to 30 percent of the areas labelled with high or moderate potential, whereas in the Mid Coast TSA the 10-percent reduction was applied to all such areas. From this, BCFS staff expect the 10-percent reduction as applied in the analysis to adequately account for the increased area of potential, and from my discussions with staff I consider this to be a reasonable expectation.

A Traditional Use Study (TUS) in the TSA (*Oweekeno Nation Traditional Use Study: A Cultural and Historical Geography*, completed by Diaz-McIlwraith Cultural Services and the Oweekeno Nation Traditional Use Study Team in December 1997, concludes that some areas associated with traditional use (e.g. food gathering, spiritual activities) are located in the timber harvesting land base. At this time it is not known whether these will have an impact on harvesting.

In reviewing this information with district staff, I am satisfied that the best available operational information has been used to address the impact of CMTs on timber supply. However, while the method used accounts for the presence of CMTs on actual cutblocks, it does not account for those in areas avoided altogether. Also, the analysis has not taken into account any other archaeological or cultural heritage resources, due to lack of available information. Even though there are some known archaeological sites within the TSA, these were not excluded from the timber harvesting land base due to the difficulty in assessing their exact location and potential impacts. If these areas could be identified and modelled it is likely there would be impacts on the size of the timber harvesting land base.

Nevertheless, from the relative insensitivity of the timber supply to the size of the land base, as noted above in *physical and economic operability* and *unmerchantable forest types...etc.*, I am satisfied that any reduction in the harvestable area in the TSA due to avoidance of areas of traditional use and archaeological significance can be accommodated without adjustment to the projected timber supply. I have therefore made no specific accounting in this determination for any additional impacts from cultural heritage resources beyond those incorporated in the timber supply analysis.

In public input, the Heiltsuk Tribal Council stated that the Crown has not fulfilled its fiduciary responsibility to the Heiltsuk to ensure that their aboriginal rights are protected and given expression. As I have noted above in "Guiding Principles...", no AAC that I determine should be construed as limiting in any way the Crown's obligations with respect to the conclusion of a treaty process, and no BCFS timber supply analysis or associated AAC determination should be interpreted as prescribing any particular pattern of harvesting activity in a TSA. From my considerations set out immediately above, and based on operational experience to date in the district, I am confident the district manager can accommodate cultural heritage resource values that may reasonably be expected at this time within the currently projected harvest levels, particularly in view of the additional stability in the timber supply noted below in 'Reasons for Decision'. My AAC determination is independent of any decision by the Minister of Forests with respect to subsequent allocation of the timber supply.

#### *- wildlife habitat*

With respect to the management of habitat for the many species of wildlife present in the Mid Coast TSA, there are many requirements, and these are discussed in detail below.

#### *- grizzly bear habitat*

The areas in the TSA that are currently managed to maintain or enhance grizzly bear habitat are those identified and mapped by MELP staff in 1988. They are unchanged from the areas considered in the 1995 timber supply review. The mapped area shows a total of about 16 000 hectares of critical forest habitat for grizzly bears, some of which is located along rivers and streams. After applying land base reductions for other values such as riparian reserves and sensitive soils, it was estimated that about 10 000 hectares of the timber harvesting land base coincide with the mapped habitat.

In the analysis, management for grizzly bear habitat on the 10 000 hectares not already excluded for other overlapping objectives was represented by applying forest cover constraints. Although grizzly bears require forests in a variety of seral stages, only the requirement for late seral forest cover was modelled, as the requirements for early forest can be met through normal timber harvesting activities and therefore have no effect on the timber supply forecast. The 10 000 hectares amount to an average of 13 percent of the timber harvesting land base in each landscape unit identified as part of the 'grizzly group', or 5.5 percent of the long term timber harvesting land base of the whole TSA. The forest cover requirement applied to the 'grizzly group' required a minimum of 13 percent of the group area to be maintained in stands older than 250 years. This was carried out in such a way that the amounts of late seral forest currently reserved for grizzly bear habitat on the timber harvesting land base were assumed to be maintained in perpetuity in the same landscape units and biogeoclimatic variants as at present. (In the previous timber supply analysis, the minimum age of stands maintained for grizzly habitat was 140 years, compared to the current 250 years.)

A sensitivity analysis was carried out on the 'Preferred reference' forecast, to examine the effect on the projected timber supply of a hypothetical doubling of the area of the timber harvesting land base required to provide later-seral-stage forest cover for grizzly habitat. This 'requirement' for 20 000 hectares (i.e. doubling the requirement for 10 000 hectares) resulted in no change in the short- or mid-term harvest levels, but the steady long-term level was reduced by about 5 percent.

In reviewing the adequacy of the provisions in the analysis for grizzly bear habitat, and the associated implications for timber supply, I note the following. The 1988 mapping provides the best information currently available for my consideration. I am advised that on the ground, grizzly habitat is managed in the TSA by long-term deferrals of harvesting in affected areas which correlate reasonably, but not precisely, with the 1988 mapping. Larger riparian areas than assumed in the analysis are often excluded from harvesting due to stream braiding and flood plains; this results in a larger area avoided operationally by licensees than was accounted for in the analysis. This additional area could overlap to some extent with areas designated through Landscape Unit Planning as old-growth management areas and through designation under the Identified Wildlife Management Strategy as wildlife habitat areas. It is clear that some uncertainty exists in the degree of correlation between the total area required for grizzly bear habitat and the assumptions applied in the analysis. The CCLCRMP process is now examining grizzly bear requirements, and new information could well result in changes in the areas and the total number of hectares required for habitat protection. The sensitivity analysis indicates that even if this process were to result in a doubling of the presently identified requirement, the projected short-term harvest level could still be met.

Since the identification and management of habitat requirements for grizzly bears have been ongoing in the TSA since well before the implementation of the Code, and since the timber supply shows a low sensitivity in the short-term harvest level to changes in these requirements, I am satisfied both that current management reflects a due respect for the needs of grizzly bears, and that the implications for timber supply of this management are adequately reflected in the current timber supply projection with substantial flexibility to accommodate changes that could result from the CCLCRMP process.

Concern was expressed in public input that increased access for timber harvesting will increase the hunting and poaching of bears in the last, biggest untouched watersheds in BC, and that harvesting will endanger other species. These issues are under consideration in the CCLCRMP process, and any land use or management decisions which are approved by Cabinet will be taken into consideration in the next AAC determination.



- *deer winter range*

In the Mid Coast TSA, deer winter range is identified separately for inner coast and outer coast areas, by biogeoclimatic variants and tree species. In areas identified as deer habitat, a minimum of 25 percent of the area is maintained at all times in stands that are more than 250 years old, and this constraint was applied in the timber supply analysis such that the requisite proportions of each variant were maintained in perpetuity in each landscape unit.

A sensitivity analysis was carried out on the 'Revised operability' forecast, to examine the effect on the harvest forecast of maintaining 50 percent of the identified areas, rather than 25 percent, in stands greater than 250 years old. I am advised that the results are applicable also to the 'Preferred reference' forecast projected from the same land base. Under this increased constraint the initial harvest level could still be met, but the duration of its maintenance was reduced by one decade. This relatively low sensitivity occurs because although under the increased constraint more older forest must be retained on the timber harvesting land base, most of the deer habitat requirement is met by forest cover outside the timber harvesting land base. This also explains why decreasing the basic constraint by half (to 12.5 percent) did not produce any increase in the timber supply, as the associated implications for forest cover on the timber harvesting land base were minor.

In public input, one licensee claimed to be unaware of the development of the deer management plan, and felt the plan should therefore not be considered current practice or included in the timber supply review. However, district staff advise me that the principles for deer management for the central coast were outlined in a 1992 MELP guidebook, and the maintenance of deer winter range is current practice in the TSA; I must therefore account for this practice in my determination.

The CCRD stated that constraints to protect habitat for all fish and wildlife are a key component of the timber supply analysis, which should model provisions for winter and summer ranges as well as denning, and provide assurance that non-commercial species within biogeoclimatic zones are protected. In response, in the analysis, technical limitations prevent the modelling of every specific situation on the landscape; instead, generalized forest cover constraints are applied to represent an overall level of retained forest cover within which the requirements of particular situations and circumstances may be met through operational administration of the AAC.

One licensee claimed it is inappropriate to model constraints on harvesting in order to meet older-forest habitat requirements because the availability of suitable habitat outside the timber harvesting land base makes retention of older forests on the operating land base unnecessary. In fact, in the Mid Coast TSA, there is relatively little conflict between habitat requirements and the timber harvesting land base since a very large proportion of old forest habitat requirements—up to 99.9 percent for cedar on the outer coast—is met by forest outside the timber harvesting land base.

In review, I am satisfied that the provision of deer winter range in suitable amounts and locations is current practice in the TSA and has been carefully and adequately represented in the analysis for my consideration in this determination.

- *identified wildlife*

Under the *Forest Practices Code of British Columbia Act*, Identified Wildlife are those wildlife species and plant communities that have been approved by the chief forester and deputy minister of Environment, Lands and Parks or designate as requiring special management. The province's Identified Wildlife Management Strategy (IWMS) for dealing with endangered, threatened,



vulnerable, and regionally significant species which have not been accounted for with existing management strategies, was announced February 19, 1999.

The BC Conservation Data Centre has listed the following as vulnerable, endangered and threatened species that may occur in the Mid Coast TSA (October 21, 1999)

| Endangered or threatened<br>(red-listed)   | Vulnerable<br>(blue-listed)  |   |
|--|--|---|
| northern goshawk<br>marbled murrelet<br>pelagic cormorant<br>sea otter<br>northern sea lion<br>Keen's long-eared myotis<br>western grebe<br>Brandt's cormorant<br>common murre<br>horned puffin<br>western red bat | tailed frog (coastal)<br>great blue heron<br>short-eared owl<br>American bittern<br>peregrine falcon<br>sandhill crane<br>pine grosbeak<br>double-crested cormorant<br>American bittern<br>trumpeter swan<br>oldsquaw<br>surf scoter<br>long-billed curlew<br>Hutton's vireo<br>fringed myotis<br>spotted bat<br>wolverine<br>badger | Bull trout<br>luscus wolverine<br>fisher<br>orca, resident<br>orca, transient<br>orca, offshore<br>grizzly bear<br>Short-billed dowitcher<br>Red-necked phalarope<br>California gull<br>Ancient murrelet<br>Cassin's auklet<br>Tufted puffin<br>Northern saw-whet owl<br>Hairy woodpecker<br>Townsend's big-eared bat |

The following have been identified in Volume 1 of the Identified Wildlife Management Strategy as species at risk that potentially occur in the Mid Coast TSA and require special management.

|                 |   |
|-----------------|---|
| Fish/Amphibians | bull trout, tailed frog   |
| Birds           | American bittern, sandhill crane, marbled murrelet, northern goshawk, western grebe, trumpeter swan, ancient murrelet |
| Mammals         | grizzly bear, mountain goat, fisher, Keen's long eared myotis   |

Identified Wildlife will be managed through the establishment of Wildlife Habitat Areas (WHAs) and the implementation of general measures for wildlife, or through other management practices specified in higher level plans. In the Mid Coast TSA timber supply analysis, no accounting was made for managing Identified Wildlife in this way because the IWMS had not been approved by government when the data package was created. Some inventory work has now been carried out, but no broadly applied current management practice for identified wildlife has yet been implemented in the TSA. However, it is expected that some of the species in the table immediately above will require management that could affect the projected timber supply. The CCLCRMP process will evaluate and likely produce recommendations for the management of grizzly bear, ungulate winter range and potentially, bull trout.

Government has set an overall limit of one percent on the allowable impact on short-term harvest levels from implementing measures for identified wildlife. Since wildlife habitat that was excluded from the harvestable land base prior to implementation of the IWMS is not anticipated to be included in evaluating the one-percent limit, MELP staff are currently examining the relationship between the one-percent limit and the grizzly bear and ungulate winter range identified and mapped for the previous timber supply review. MELP had anticipated that these areas, which total approximately 10 000 hectares, would be excluded from the timber harvesting land base. While MELP staff acknowledge that the cover constraints as applied will provide adequate cover for ongoing habitat requirements, they are also reviewing the possibility that the critical habitats identified in the earlier mapping could be established as WHAs.

Concern has been expressed for the management of some identified species because most of the inventory efforts in the TSA are currently directed toward grizzly bear management. Mapping critical habitats for these species and implementing draft WHAs for known locations will provide for better management of these species and will reduce uncertainties for future timber supply analyses.

At this stage it is too early to speculate on the total habitat area that will be required to implement the IWMS, and on how much of this area will lie within the current timber harvesting land base. It is possible that the CCLCRMP process could lead to habitat requirements (e.g. for grizzly bears and possibly bull trout) in excess of the one-percent limit, which could become binding as part of a higher level plan. Additional area could also be required under the Code for ungulate winter range, and additional area may also become designated as WHAs for previously managed habitats.

The total eventual implications of these measures for timber supply cannot currently be known, and inventories are required to reduce the uncertainties. However, government has committed to appropriate management of identified wildlife species on the understanding that this can be attained within a provincial timber supply impact of one percent. (In a recent study which projected the management impacts from expected occurrences of all species in Volume 1 of the Strategy, the total provincial impact on timber supply amounted to only one-half of one percent.)

Since no accounting was made in the analysis for the management of identified wildlife, for this determination I have accounted for a one-percent overestimation in the timber harvesting land base used for the 'Preferred reference' forecast, as discussed in 'Reasons for Decision'.

#### *- stand-level biodiversity*

Biological diversity, or biodiversity, is defined as the full range of living organisms, in all their forms and levels of organization, and includes the diversity of genes, species and ecosystems, and the evolutionary and functional processes that link them. Under the Forest Practices Code, biodiversity in a given management unit is assessed and managed at the stand and landscape levels.

Stand-level biodiversity is managed in part by retaining reserves of mature timber or wildlife tree patches (WTP) within cutblocks and in adjacent inoperable and other retained areas to provide structural diversity and wildlife habitat. Other provision is made through the retention of coarse woody debris.

In the Mid Coast TSA, WTPs, which are combined where possible with riparian and other areas excluded from the timber harvesting land base, are generally larger than 2 hectares in size and are left to maintain forest stand structure on the landscape over time. Objectives for coarse woody debris are met by unmerchantable material left on cutblocks following harvesting, and by material from outside cut blocks.

In the timber supply analysis, for considering stand-level biodiversity, Table 20a of the *Biodiversity Guidebook*, which is consistent with Table A3.1 of the Landscape Unit Planning Guide published in March 1999 was used to derive an estimate of the required area of WTPs for each landscape unit independently. It was assumed that 75 percent of the WTPs would be found in riparian and other areas outside the timber harvesting land base, that WTPs would not be harvested at a later date, and that since the patches are greater than 2 hectares in size, they will contribute to meeting landscape-level requirements for old-seral forest cover. An area reduction was used to model WTP requirements rather than a volume reduction, as this more accurately reflects the area on which harvesting will occur. The required areas derived for WTPs accounted for the proportions of each landscape unit that are harvestable and already harvested.

Using this method, the percentage of the timber harvesting land base required for WTPs ranged from 1 to 4 percent by landscape unit. To reflect this in the analysis, a multiplier was applied to reduce by an appropriate factor the area assumed to be available for harvesting within each landscape unit/biogeoclimatic variant combination.

Public input on stand-level biodiversity included a comment from a licensee that no additional exclusion for WTPs should be required in view of the large inoperable area in the TSA, the riparian reserves, and the riparian management areas.

In assessing the adequacy of the accounting in the analysis for stand-level biodiversity, I note that care was taken to attribute area reductions at the biogeoclimatic variant level, and that it was assumed that 75 percent of the requirements could be met without further constraint on the timber supply beyond that imposed to meet other specific objectives. I do not consider it reasonable to expect a higher contribution than this from outside the timber harvesting land base, particularly in view of current trends on the coast toward variable retention silvicultural systems. If over time it becomes evident that objectives can be met with a smaller contribution from the timber harvesting land base, this can be reflected in a future analysis. For the present determination, I am satisfied that the 'Preferred reference' projection includes an adequate accounting for stand-level biodiversity objectives.

#### *- landscape-level biodiversity*

Achieving landscape-level biodiversity objectives involves maintaining forests with a variety of patch sizes, seral stages, and forest stand attributes and structures, across a variety of ecosystems and landscapes. Managing for biodiversity is based in part on the principle that this—together with other provisions in the Forest Practices Code, such as riparian management, maintenance of wildlife trees, and other forest cover objectives as discussed throughout this document—will provide for the habitat needs of most forest and range organisms. A major consideration in managing for biodiversity at the landscape level is leaving sufficient and reasonably located patches of old-growth forests for species dependent on, or strongly associated with, old-growth forests.

Although some general forest management practices can broadly accommodate the needs of most ecosystems, more often a variety of practices is needed to represent the different natural disturbance patterns under which ecosystems have evolved. Natural disturbance types (NDTs) vary from frequent wildfires in the dry interior regions to rare stand-initiating events (from wind, fire, and landslides) in the wetter coastal regions. In accounting for landscape level biodiversity in the analysis, a number of modelling assumptions were made which are discussed below.

- biodiversity emphasis options

Delineating and formally designating "landscape units" is a key component in the strategic management of biodiversity at the sub-regional level. The *Higher Level Plans: Policy and Procedures, December 1996* outlines three biodiversity emphasis options (BEOs)—lower, intermediate and higher—for application in establishing biodiversity management objectives for a landscape unit. Each option is designed to provide a different level of natural biodiversity, and a different risk to the maintenance of elements of natural biodiversity, when finding an appropriate balance between biodiversity and timber supply in establishing the objectives.

In the absence of formally designated BEOs with established objectives, the established procedure, and direction to timber supply analysts, is to create a weighted representation of old forest retention for each landscape unit or biogeoclimatic variant by weighting approximately 45 percent of the requirement for old forest area in the lower, approximately 45 percent in the intermediate, and approximately 10 percent in the higher BEOs. In the Mid Coast TSA, interim BEOs have been assigned to each landscape unit through the regional landscape unit planning strategy but have not yet been formally designated; this weighted-average 45-45-10-approach was therefore used in the 'Preferred reference' forecast.

- seral stage requirements

Provincial policy as documented in the *Landscape Unit Planning Guide* requires that to the extent possible, the requisite areas of retained cover for landscape-level biodiversity management should be located in areas that are already constrained from harvesting (i.e. the non-contributing land base), for example in inoperable areas or riparian reserves. I am advised that the method followed in the analysis for the Mid-Coast TSA approximates this requirement. Provincial policy also acknowledges that the late seral (i.e. old growth) requirements are the most important in achieving landscape-level biodiversity objectives and should be applied operationally in all landscape units. The 'mature-plus-old' and 'early seral' requirements are considered less critical to achieving landscape level biodiversity objectives, and often have partial overlap with other forest management prescriptions. It is therefore provincial policy not to apply these requirements operationally unless it can be shown in a timber supply analysis that the application of these seral stage targets will not affect the projected timber supply.

For the Mid Coast TSA, analysis showed that applying the early and mature-plus-old requirements has essentially no impact on the timber supply forecast. The reason is that in most landscape units these requirements can be met by forest outside the timber harvesting land base.

The old-growth seral stage requirements for the Mid-Coast TSA were calculated on the basis that in areas of low-biodiversity emphasis, one-third of the constraint would be achieved immediately, with the full constraint being phased in over three rotations, i.e. about 210 years, consistent with provincial policy. However, analysis showed that the projected timber supply could be met without applying this 'drawdown', which therefore may not be required operationally.

A sensitivity analysis on the 'Revised operability' forecast, which I am advised remains valid for the 'Preferred reference' forecast, showed no change in the projected timber supply when the default average BEO assignments (45, 45, 10) were replaced with the draft emphases for each landscape unit.

From this information and from my discussions with BCFS staff, I am satisfied that the relevant provincial policy has been properly applied, and that appropriate consideration of the forest cover



requirements to meet objectives for managing biodiversity at the landscape level has been incorporated in the 'Preferred reference' timber supply forecast. I therefore consider this forecast adequate for use on this account in my determination.

- (vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber;

### Pristine watersheds

The BC Land Use Coordination Office defines a watershed in the province as pristine if there is no evidence of post-First-Nation-contact activity or if there are only small openings or selective removal of individual trees, or land clearing which is limited to less than 5 hectares. Pristine watersheds, including sub-watersheds, as defined by LUCO, comprise approximately 1 469 695 hectares in the Mid Coast TSA, primarily in the very wet maritime transition zone between inner and outer coast and in the very wet hypermaritime zone, or the outer coast. Of the 1 469 695 hectares, 67 638 hectares lie within the timber harvesting land base. This represents very approximately one-third of the timber harvesting land base in the TSA.

The avoidance of logging in some pristine watersheds in the central coast area of BC is a condition of participation in the CCLCRMP process by environmental non-government organizations (ENGOS), and no harvesting is currently taking place in these specified areas. Continuation of this avoidance is subject to agreements between licensees and the environmental non-government organizations. Some watersheds, such as the Smokehouse and Ellerslie Lake area, have been formally approved by government as study areas under the Protected Areas Strategy.

As part of the CCLCRMP process, a report entitled *A Conservation Area Design for the Central Coast Region of British Columbia* has been prepared by the ENGOS, which recommends the protection of considerable portions of the Mid Coast Area. This report, and government's own *Revised Study Areas for the Central Coast LRMP Area*, indicate that significant changes to the land base of the Mid Coast TSA, through the protection of pristine watersheds and other areas, are being contemplated at the planning stage.

However, to date, no formal procedure has been undertaken by government to remove any pristine watershed from the land base of the TSA, and the avoidance of harvesting in such areas remains a voluntary, cooperative action between licensees and BCFS district staff. As noted in my 'Guiding principles for AAC determinations', and as discussed in detail in my rationales for a number of AAC determinations, notably for the Fraser TSA in 1995, and as further referenced in a 1998 decision of the BC Court of Appeal, in the case of large scale policy issues affecting land use, until formal decisions are made by government, I do not consider it reasonable to attempt to reflect the potential timber supply implications of their possible but uncertain outcomes in my determination of an AAC under section 8 of the *Forest Act*. If and when formal decisions are taken by government to remove these areas, or parts of them, from the land base of the TSA, at that time I will review the associated implications for timber supply. Since these implications are potentially significant, given the large size of the affected land base, if necessary I will determine the AAC for the TSA at a date earlier than the regular review required by statute.

In the meantime, continued avoidance of harvesting in this large area necessitates increased rates of harvest in other parts of the TSA, which in turn pose planning problems that are becoming increasingly difficult to resolve.



The avoidance of harvesting discussed so far is either in respect of agreements between industry and environmental groups to facilitate the CCLCRMP, or in respect of study areas approved by government, and in either case is likely to continue until the CCLCRMP process is complete and a plan has been approved. The resulting operational planning difficulties are compounded by the deferral of harvesting in yet other areas, as described in the following section, Planning deferrals.

As noted above, until such time as government makes formal land-use decisions for these areas, I will not exclude them from consideration in this determination. I therefore recommend that if the operational planning difficulties resulting from avoiding harvesting in pristine watersheds become clearly unmanageable, the district manager should consider taking steps to request that Cabinet specify appropriate areas as designated areas under Part 13 of the *Forest Act*, in order that a temporary reduction might be applied to the AAC for the TSA in respect of those specified areas.

One other possible solution could potentially be found through the reduction, under section 61 of the *Forest Act*, by the minister with the consent of affected licensees, of certain authorised licence volumes. This would require licensees to voluntarily forego operations, and in order to effectively reduce pressures on the rest of the timber harvesting land base, would require that the volume of such reductions not be made available for disposition to persons other than the affected licensees. Decisions on these matters are not within my authority as chief forester.

### Planning deferrals

In eight areas within the TSA, timber harvesting has been avoided since the late 1980's, primarily due to concerns and issues raised by First Nations, (although there is some overlap with areas discussed in the above section on pristine watersheds). These areas include Ellerslie Lake, Hotsprings Creek, Kitasoo Hill, Necleetsconnay River, Skowquiltz, Thorsen Creek, Tankeeah River, and Walkus Lake. These areas cover 6814 hectares of the timber harvesting land base and support 4.6 million cubic metres of mature timber.

Three of these areas have been identified as Protected Areas Strategy Study Areas for the Central Coast LCRMP Area (i.e. the Ellerslie Lake/Harbour, Hotsprings Creek, and Walkus Lake). These three areas include 3988 hectares of the timber harvesting land base and support 2.7 million cubic metres of mature timber. No harvesting will take place in these areas at least until resolution through the CCLCRMP.

In the Necleetsconnay River and Thorsen Creek areas, in the timber supply analysis for the previous AAC determination, harvesting was assumed to be deferred for ten years. In the current analysis, these areas were assumed to be available for harvesting, as district staff are more optimistic that the associated issues will be resolved in the next five years. These two areas cover 1510 hectares of the timber harvesting land base and support 1.1 million cubic metres of mature timber.

District staff advise me that resolution of the issues in the remaining areas likely depends in part on providing tenure opportunities and on consultations with First Nations.

The total area of the timber harvesting land base subjected to planning delays in this way is nearly 7000 hectares. As long as harvesting does not proceed in these areas, pending the resolution of outstanding issues with First Nations and the outcome of the CCLCRMP and associated decisions on the study areas, operational planning difficulties associated with correspondingly increased harvest rates in other parts of the TSA will likely worsen, as noted above in Pristine watersheds. I am advised that the district manager is already unable to approve approximately 20 percent of the

overall timber volume in the five-year forest development plans due to operational and planning constraints and only a three-year supply is currently identified. Approved cutblocks—particularly in marginal areas—have had to be removed from cutting permits due to unanticipated economic constraints. As I noted in the section above, if operational planning difficulties become clearly unmanageable, the district manager may wish to request Cabinet to specify certain areas as designated areas under Part 13 of the *Forest Act*, in order that a temporary reduction might be applied to the AAC for the TSA in respect of the specified areas. Alternatively, application of section 61 of the *Forest Act* could be contemplated, as discussed above in 'Pristine watersheds'.

### Other First-Nations issues

In addition to the information considered above in *cultural heritage resources*, I have also considered the following input to my determination.

The Oweekeno-Kitasoo-Nuxalk Tribal Council does not accept the authority of the Chief Forester to determine an AAC for the Mid Coast TSA, and has expressed the desire to establish a sustainable harvest level for each of their traditional territories. Council members stated that past harvesting in the Bella Coola valley has left only marginally economic areas for harvest, and that the current licensing structure directs benefits from harvesting in their traditional territories to the Lower Mainland area, with little or no perceived benefit to the primarily First Nations Mid Coast population. They have therefore questioned the Crown's social and economic objectives for the area. The Council submitted a report: *Oweekeno-Kitasoo-Nuxalk First Nations Review of the Mid Coast Forest Sector, May 1997*, with an update advocating that the Mid Coast TSA harvest be reduced immediately or over 10 years to 500,000 or 550,000 cubic metres to avoid drawing down the timber capital while treaty negotiations are underway. The report also discussed issues related to marginally economic stands, which I have discussed above, in *physical and economic operability*.

The Heiltsuk Tribal Council is concerned about the impact of the AAC on their traditional territory, and about the potential implications for First Nations treaties from future AACs that will be based on the Central Coast Land and Coastal Resources Planning process. Both Tribal Councils noted poverty and very high unemployment levels among First Nation members who reside in the Mid Coast TSA and indicate a strong interest in expanding their participation in the forest industry.

The Heiltsuk Tribal Council maintained the Crown has not fulfilled its fiduciary responsibility to the Heiltsuk, to ensure their aboriginal rights are protected and given expression.

An environmental non-government organization submitted that continued harvesting in traditional territories where land title is under dispute is unjust and is compounded by the concentrated harvesting of sites of good and medium productivity at rates above the long-term level prior to resolution of title issues.

Having considered this input carefully, understanding the reasons for and the nature of the concerns expressed, and relying on my authority to address matters within my jurisdiction as chief forester in making an AAC determination for the Mid Coast TSA by considering the provisions of section 8 of the *Forest Act*, my responses are as follows.

With respect to the issues of fiduciary responsibility and the advocated large reductions in harvest level pending resolution of land title issues—and particularly with respect to reducing the harvest level to 500 000 or 550 000 cubic metres within ten years—as chief forester I am required by statute to determine an AAC for this and all TSAs in the province, every five years. Land claim

processes are ongoing separately and concurrently, and, in accordance with my stated guiding principles for AAC determinations, as formal decisions are made that result in changes in land use or ownership, any significant timber supply implications for the TSA will be reflected in a new AAC as early as possible. In all determinations I must consider the social and economic objectives of the Crown as expressed by the Minister of Forests. As currently expressed, these objectives preclude the determination of a large, disruptive AAC reduction unless such is required to avoid compromising the long-term productivity of the forest (see below, Minister's letter and memorandum).

With respect to opportunities for including First Nations in the economic benefits of timber harvesting, either in joint ventures with existing licensees or in other forms of tenure, these are matters for consideration by the Minister of Forests with respect to the apportionment of the AAC I am now determining, rather than by me as chief forester in the determination of the AAC itself.

With respect to establishing harvest levels for traditional territories identified by individual First Nations, Section 8 of the *Forest Act* requires me to determine an AAC for the TSA *as a whole*. The Act does not provide me with authority to determine multiple harvest levels for specific areas *within* a TSA (e.g. a traditional territory associated with a particular First Nation) although harvest volumes may be specified as attributable to different types of terrain or timber.

In conclusion, I reiterate that it is inappropriate for me to speculate on impacts on land base or timber supply that may ensue from treaty agreements until such decisions or agreements are formally complete and implemented. Nevertheless, no AAC that I determine should be construed as limiting in any way the Crown's obligations with respect to the conclusion of a treaty process, and as I have noted earlier in *cultural heritage resources*, in the interim no BCFS timber supply analysis or associated AAC determination should be interpreted as prescribing any particular pattern of harvesting activity in a TSA.

#### Partitioned component of the harvest

The current AAC, determined in 1995, includes a partitioned component of 130 000 cubic metres (13 percent of the AAC) attributable to stands of uncertain economic viability. These stands were included as a separate component of the AAC to allow industry to demonstrate its willingness and ability to include them in the harvest. From 1992 to 1998 stands meeting the criteria for the partition have contributed nearly 15 percent to the actual harvest. As noted above in *physical and economic operability*, this harvesting has provided adequate evidence of the physical and economic feasibility of an ongoing contribution to the AAC from these types and areas. Acknowledging this, but also recognizing the dependence of the harvest levels projected in the 'Preferred reference' forecast on ongoing contributions from various kinds of marginally economic stands (amounting to roughly one third of the AAC, in my current determination I have given a good deal of consideration to the effectiveness or otherwise of meeting certain forest management objectives by specifying portions of the harvest as attributable to particular forest types or areas.

The harvest levels projected in the 'Preferred reference' forecast include ongoing contributions of (a) 59 000 cubic metres from the outer coast, and (b) 178 000 cubic metres from areas harvestable by non-conventional systems. In addition it is assumed that, over time, all of the hemlock-balsam stands in the timber harvesting land base, including (c) that half which is comprised of decadent stands on sites of low and poor productivity, will be harvested. For the projected overall harvest level in the TSA to be attained without compounding planning difficulties in other, more productive or more accessible areas, and without jeopardizing the validity of the projected future timber supply, all three of these identified components must be harvested to an appropriate extent.

Staff of MELP have expressed a concern in this regard. In their view, without a partition in the allowable harvest, there is no incentive for licensees to distribute the harvest in the TSA, and a consequent acceleration in harvests in 'conventional' areas, compounded by extensive log-arounds and deferrals, could place non-timber resources at risk. Acknowledging that the Code is intended to prevent the compromise of non-timber resources, MELP staff portray the Code as protecting a minimum acceptable standard which should be improved upon wherever possible to provide reduced levels of risk to these resources. To achieve this, MELP recommended specifying a maximum harvest level for conventional areas, and a separate level for all areas outside the conventionally operable land base. MELP also recommended separate levels for outer coast and for unconventional areas.

In public input, one licensee has advocated a partition of 180 000 cubic metres for marginal forest types. BCFS district staff note that while licensees have demonstrated an ability to perform in the currently partitioned areas, and while current forest development plans do show a forecast level of 170 000 cubic metres annually for helicopter harvest, the least economically viable blocks in a number of approved cutting permits for another licensee have proven not to be economically feasible. This indicates the need for some form of direction to ensure that the less economical components of the allowable harvest are utilized.

In review, the context in which I must determine the advisability or otherwise of a partitioned cut is as follows. A large area of uncertain economic viability that was not included in the timber harvesting land base for the previous analysis, i.e. the outer coast and areas outside conventional operability lines, has now been incorporated in the harvestable land base and is projected to contribute almost one-quarter of the annual harvest. All components of this large area must be harvested in reasonable proportion to their projected contributions or difficulties will arise in meeting objectives for other forest values. Further, while 'decadent' hemlock-balsam stands on sites of poor and low productivity comprise one-third of the timber harvesting land base, they currently contribute significantly less to the actual harvest. Sensitivity analysis showed that half the hemlock-balsam stands in all age classes on poor and low sites could be discounted without affecting the starting level for one decade, but the mid and long-term levels would be affected and to avoid this, these stands must become a larger component of the harvest than at present. A steady harvest level in proportion to the presence of these stands on the landscape would be in the order of 200 000 cubic metres annually.

From all this the importance of ensuring appropriate levels in four components of the harvest is evident:

- (a) The harvest must be increased from the present level in stands of poor and low-productivity hemlock-balsam in the inner coast area;
- (b) The harvest must be increased from the present level in stands of poor and low-productivity on the outer coast;
- (c) Volumes comparable to those identified in the operability review must be harvested in areas outside conventional operability lines on the inner and outer coast areas; and
- (d) Conventionally operable areas on the inner coast must not be allowed to contribute disproportionately high volumes to compensate for too little harvest elsewhere.

Of these, the most significant to the maintenance of projected harvest levels is the contribution of hemlock-balsam stands on sites of poor and low productivity. This is necessary to avoid the potential for a progressive decline in the availability of economically accessible timber over time. Some of these stands, which may be economically harvestable in the short term in conjunction with more valuable stands, may not be economical to harvest in isolation later.



District staff have identified both advantages and disadvantages in administering partitioned cuts as a means of managing to meet objectives for a range of resources. One significant advantage is that under the *Forest Act*, a partition, together with the Forest Licence agreement, allows the district manager to request annual reporting in each of the specified component harvests. However, the requirement to harvest in each of the specified components is difficult to apply equitably to all licensees in all areas with varying scales of operation. Certain levels of partition could constrain potential tenure arrangements for communities in certain parts of the TSA, or alternatively, could necessitate forms of harvesting which are incompatible with their local social needs. I understand that these issues would be logistically extremely difficult to resolve through the trading of harvesting rights and obligations.

Having discussed these issues in detail with district staff, I find as follows. Ideally it would be desirable to specify separate harvest contributions from each of the components identified. However, I accept that the logistical and administrative difficulties attached to accessing, monitoring and enforcing harvests from the separate timber types, in sometimes physically separate, and sometimes overlapping terrains, particularly in the case of small-scale, location-specific operations, preclude effective implementation of this option. Nevertheless, I remain convinced of the particular importance, to the validity of the projected economically accessible timber supply, of achieving and maintaining an appropriate proportional contribution to the harvest from hemlock-balsam stands on sites of poor and low productivity, in both outer and inner coast areas. I have therefore concluded that it would be appropriate to specify that, of the one million cubic metre initial harvest level projected in the 'Preferred reference' forecast, a combined total of 200 000 cubic metres should be attributable to harvesting in these stands in the outer and inner coast areas. Adherence to this requirement would ensure the overall harvest level for the TSA is not rendered artificially high by an assumed but unrealistic contribution from uneconomic timber stands.

The volume of 200 000 cubic metres attributable to these marginally economic stands is derived as follows. The currently projected long-term sustainable harvest level for the TSA in the 'Preferred reference' forecast is 730 000 cubic metres. This harvest level in the long term will consist of harvests from regenerated stands only. At that time, when the entire harvest contribution from hemlock-balsam stands on sites of poor and low productivity will be derived from regenerated stands, their steady contribution to the long-term level is projected to be 155 000 cubic metres, or 21 percent of the total annual harvest. In order to maintain a consistent proportional contribution over time from these stands to the total harvest, it would therefore be appropriate to specify in the short term, when the harvest level is projected to be one million cubic metres, a contribution from the 'poor and low-site' hemlock-balsam stands of roughly 21 percent, or about 200 000 cubic metres. Since the contributions of the poor and low site classes to the timber supply are roughly equal, it is necessary that the administration of the partition provides for harvesting from sites of both poor and low productivity, and thereby provides evidence with respect to the economic viability of the sites and their appropriate inclusion in the timber harvesting land base.

Also, as noted in 'Reasons for Decision', the AAC I have determined is dependent and conditional upon the ongoing maintenance of harvest contributions at the sustainable levels of 59 000 cubic metres from outer coast areas, and 178 000 cubic metres from non-conventional areas. It should be clarified that the amounts harvested under the 200 000 cubic metre partition may overlap with either of these latter contributions. I expect district staff to closely monitor and ensure the appropriate levels of harvesting in each of these categories.

Responsibility for the ongoing administration of the hemlock-balsam partition and the other concurrent harvest level requirements described above must fall to the District Manager. To



facilitate management of this admittedly complex task over the effective period of this AAC, I will require only that I be able to fully review the levels of performance in all the respective categories at the time of the next AAC determination, which is expected to take place in five years' time, or less pending resolution of major land-use issues noted in this rationale.

If it becomes apparent that operations cannot be appropriately balanced, due to difficulties with either economics or administration, this will likely serve to prompt reconsideration of the contributions of the areas in question at the time of the next AAC determination. Meanwhile, with the implementation of the partition for a specified harvest in hemlock-balsam stands of poor and low productivity, in conjunction with the past and expected performance in outer coast areas and areas outside conventional operability, I am satisfied that appropriate measures have been taken in this decision to ensure the sustainability of the harvest.

- (b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area;

### Alternative harvest flows

The nature of the transition from harvesting old growth to harvesting second growth is a major consideration in determining AACs in many parts of the province. In the short term, the presence of large volumes of older forests often permits harvesting above long-term levels without jeopardizing future timber supply. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined to ensure that current and medium-term harvest levels will be compatible with a smooth transition toward the usually (but not always) lower long-term harvest level. Thus, timber supply should remain sufficiently stable so that there will be no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply nor so low as to cause immediate social and economic impacts that are not required to maintain forest productivity and future harvest stability.

The June, 1999 *Timber Supply Review Mid Coast Timber Supply Area Analysis Report* identified many possible alternative harvest rates for the short and mid terms, with each alternative representing a trade-off between the short-term rate of harvest and the timing and severity of the decline to the steady long-term level. The harvest flow alternatives shown were also contingent on harvesting varying proportions of the total harvest level from marginal outer coast stands and areas that can only be harvested using helicopters. As I have discussed in detail in Timber supply analysis and reference forecast for the Mid Coast TSA, three of these were presented as main alternative projections for my consideration as possible reference forecasts, based on differing assumptions about the area that is suitable and available for timber harvesting. In that section and in *physical and economic operability* I have described the reasons for my request for an additional projection, the "Preferred reference" forecast, and the reasons for my reliance on this forecast as a point of reference for my considerations in this determination.

In addition to the three main reference forecasts, the timber supply analysis report also showed the result of increasing the initial harvest level by 10 percent and by 20 percent above the current AAC, based on the assumptions in the 'Revised operability' forecast (fig. 19 in the report). Another projection based on assumptions similar to those in the 'Preferred reference' forecast (fig 18 in the report) showed that under those assumptions the harvest level could remain above the current AAC for one decade before declining to approximately the same long-term level as in the 'Preferred reference' forecast.

I have given my reasons for rejecting the assumptions in the 'Revised operability' forecast as an appropriate basis for this determination, in the sections referenced above, and this rejection would apply to any alternative forecast based on those assumptions, including the two noted here. However, at this time I would also reject as reference forecasts both of these projections and the figure 18 projection, on the basis that all current projections indicate a declining timber supply, and in the current context of extensive planning deferrals and 'log-arounds', together with the potential for land use changes to advance or heighten these declines, this would not be an appropriate time to reduce the margins of flexibility in managing for a range of resources by increasing the allowable cut. I have acknowledged the possibility of future increases to the timber supply from old-growth site index adjustments, but I have also noted the need for caution in their application. For all these reasons I have rejected the alternative of an increased harvest level as a suitable reference forecast at this time.

One alternative projection to which I have given significant consideration is a sensitivity analysis carried out on the 'Preferred reference' forecast, referred to in *unmerchantable forest types, including sites with low timber productivity* and in *Partitioned component of the harvest*, in which half the hemlock-balsam stands in all age classes on sites of poor and low productivity (about 26 000 hectares) were excluded from the timber harvesting land base. As noted, in that projection the starting level of one million cubic metres could still be met for one decade, which indicates considerable robustness in the short term supply. However, the long-term level was reduced by nearly 10 percent from 730 000 to 660 000 cubic metres. The current low level of harvest in these stands, and their dependence for harvesting on favourable economic conditions thus has significant implications for the attainability of the projected future timber supply, and I have addressed this in my determination, as discussed in the sections noted above and in 'Reasons for decision'.

In making my determination, I have taken into account the harvest flow implications of a range of uncertainties related to specific considerations laid out in this document.

### Community dependence on the forest industry

The population of the Mid Coast area, recorded at 4232 persons in the 1996 Census, is projected to grow at below the average provincial rate to reach 4435 in 2001. The First Nations population is growing faster than the non-aboriginal population, and its average age is becoming lower. At present, 21 percent of the Mid Coast labour force is supported directly and indirectly by the forestry sector. The public sector, currently the primary employer in the area, supports 39 percent. Growth in the resident labour force in the area is expected to slow from 1996 to 2001. The forest industry currently provides the highest average income in the Mid Coast area.

The Mid Coast TSA currently provides 993 person-years of direct employment in the province annually, plus 1234 person-years of indirect and induced employment, for a total of 2227 person-years, based on an average 1995-97 annual harvest of 801 016 cubic metres. Residents of the Mid Coast Forest District account for 15 percent of the direct employment. Thus, most of the employment, and most of the income, generated by the TSA harvest occurs outside the local area.

If the projected initial harvest level of one million cubic metres in the 'Preferred reference' forecast were to be fully harvested, the direct employment generated locally each year would be 190 person-years, up by 40 person-years from the present level based on the 1995-97 harvest. The corresponding provincial figure would be 1240, up by 250 from the present level. For indirect and induced employment at the full AAC, 70 person years would be generated locally, up by 14 person-years, and provincially 1540, up by 306 person-years. This would also increase stumpage and

related revenues by roughly 3.1 million dollars, or 6.9 million including stumpage, royalties and rent, industry taxes and income taxes.

In public input, First Nations drew attention to what they consider to be an inequitable distribution of forest jobs and revenues, given that First Nations comprise the majority of residents in the Mid Coast area. This view was also presented by an environmental organization which noted the local community bears the cost of risk to local non-timber resources without direct social or economic benefits from timber harvesting. This is primarily an issue of tenure and apportionment of the allowable harvest, which the *Forest Act* does not provide me with the authority to address in determining allowable annual cuts. The CCRD also raised a number of issues related to employment, the value obtained from the harvested timber, and its ultimate destination, which again, I have no authority to address beyond determining the amount of timber that may be harvested in support of such activities and benefits, however they may be distributed.

First Nations did not feel the socio-economic description of the area in the timber supply analysis was accurate, and the environmental group asserted that the socio-economic assumptions used to assess risk and opportunity are limited to the status quo, failing to incorporate the economic contribution of non-timber forest values, including those of fish habitat, wilderness and visual values for tourism, ecosystem integrity, and the protection of threatened and endangered species. In response, the socio-economic analysis is intended to provide a general view of the role of the forest industry in the area with respect to the level of economic diversity, primarily to assist in assessing the implications of changes in harvest levels. The Forest Practices Code is intended to provide for the identification and protection of non-timber values so that timber harvesting may proceed without unacceptable impacts to these values. In the timber supply review, as documented in many places in this rationale statement, explicit allowances are made and accounted for to provide for a range of non-timber values.

#### Difference between AAC and actual harvest

During the cut-control period from 1992 to 1996, forest licence holders cut within acceptable limits at 1.6 percent more than the AAC. For the years 1997 and 1998, the actual forest licence cut has been lower, at 74 percent of the AAC. In the last few years low world prices for pulp have caused forest licensees to reduce production levels. However, recent increases have been noted in the price of pulp, and are expected to result in increased levels of development. District staff advise me that overall, licensees have met the AAC cut control requirements historically, and plan to meet them within the current five-year period which ends in 2001.

- (c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities;

#### Timber processing facilities

*Existing facilities:* Little Valley Forest Products (1993) Ltd., is the only major processing facility located in the Mid Coast TSA. Little Valley has a value-added manufacturing facility in the Bella Coola valley, which is presently supported by two timber sale licences. Recently the facility has undergone a considerable upgrading and expansion to increase the product line to eventually include speciality products, lattice, and a veneer slicing operation. The company buys additional wood locally and trades wood amongst the licences to get its required products.

With the exception of Little Valley Forest Products, timber from the TSA supports processors located primarily on Vancouver Island and the lower mainland regions. The two major licensees

in the TSA use wood products from the TSA to help support facilities outside the TSA as follows. Western Forest Products or Doman Industries Ltd. and Doman-Western Lumber Ltd., operate 9 lumber mills on Vancouver Island and the lower mainland and also a pulp mill in each location. International Forest Products Ltd. has 7 operating sawmills located outside the TSA which depend in part on wood products from the TSA. In addition, Mill & Timber Products Ltd. which holds a very small replaceable forest licence quota, has a sawmill in Surrey which processes its harvest from the TSA.

Numerous small operators employ a variety of one- and two-person mobile milling operations. These operators tend to require small amounts of wood often obtained through the small scale salvage program and supply local demand for dimension lumber.

*Proposed facilities:* District staff advise that except for the nearly completed upgrade to the Little Valley mill, due to the generally depressed coastal log markets and the ongoing rationalization in the forest industry there are few proposals under discussion for new processing facilities in the area. I am advised that the availability of sufficient electrical supply may be a limiting factor in any future significant proposals. Little Valley Forest Products has commented that with the completion of its new manufacturing plant, it will need a substantially increased steady flow of timber.

First Nations have recently considered construction of a value-added facility in conjunction with a central dryland sort near Bella Bella or in a proposed joint venture with a major licensee. The small scale salvage program provides ongoing opportunities for owner operators to find innovative niche markets for their products.

- (d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia;

#### Minister's letter and memorandum

The Minister has expressed the economic and social objectives of the Crown for the province in two documents to the chief forester—a letter dated July 28, 1994, (attached as Appendix 3) and a memorandum dated February 26, 1996, (attached as Appendix 4). This letter and memorandum together include references to forest investments, forest stewardship, a stable timber supply, and allowance of time for communities to adjust to harvest-level changes in a managed transition from old-growth to second-growth forests, so as to provide for community stability.

The Minister stated in his letter of July 28, 1994, that "any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability." He placed particular emphasis on the importance of long-term community stability and the continued availability of good forest jobs. To this end he asked that the chief forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomical areas. To encourage this the Minister suggested consideration of partitioned AACs.

I have reviewed the opportunities for commercial thinning, and, as discussed under "Incremental silviculture", conditions are not appropriate for this form of harvesting in this TSA at this time. With respect to harvesting in previously uneconomic areas, as discussed extensively in *physical and economic operability* and in Partitioned component of the harvest, the current timber supply projection includes ongoing contributions at sustainable levels from marginally economic areas in the outer coast and in areas operable only by helicopter. As discussed in those sections and in 'Timber supply analysis and reference forecast', I consider that in the reference forecast on which



I have chosen to place primary weight in this determination, the fullest reliable advantage has been taken of the potential contribution to timber supply from marginally economic stands. I am also satisfied that the recent operability mapping exercises, which included licensee participation, provide a suitable indication of the extent of the physical and economic harvesting potential in the TSA at this time, which has been adequately reflected in the 'Preferred reference' forecast.

The Minister's memorandum addressed the effects of visual resource management on timber supply. In it, the Minister asked that pre-Code constraints applied to timber supply in order to meet VQOs be re-examined when determining AACs in order to ensure they do not unreasonably restrict timber supply. As discussed under *visually sensitive areas*, in response to the 1998 provincial strategy for visual quality management the Mid Coast Forest District manages moderately sensitive scenic areas to the next least restrictive RVQC. This is consistent with the intent of the Minister's memorandum, and was reflected in the 'Preferred reference' forecast.

### Local objectives

The Minister's letter of July 28, 1994, suggests that the chief forester should consider important social and economic objectives that may be derived from the public input in the timber supply review where these are consistent with government's broader objectives. The BCFS took a number of steps to provide opportunities for public review through the timber supply review process for the Mid Coast TSA, including public opportunities to review the data package and the timber supply review analysis, and to respond to a public discussion paper. The information report and data package, as well as the discussion paper and analysis report, were distributed by mail to a comprehensive list of stakeholders. A presentation was made to the CCLCRMP table; the timber supply analyst met with the Heiltsuk Tribal Council; and a public information session was held in Bella Coola, attended by representatives of four central coast First Nations. In addition, prior to my determination I met locally with the Oweekeno, Kitasoo, Nuxalk Tribal Council and the Heiltsuk Tribal Council to discuss matters related to the determination.

In response, I have received considerable input from regional district representatives, licensees, First Nations, interest groups, and individuals. Wherever possible, I have attempted in the appropriate sections of this rationale to respond briefly to the views expressed, and consideration of this input has been an important component of this determination.

In addition, substantial input has been received which identifies important local concerns and objectives related to the *disposition of the social and economic benefits* that may be realised from timber harvesting in the area, in relationship to other existing or potential income-generating activities. A good deal of this information does not relate directly to my assessment of the *amount* of timber harvestable annually to contribute to socio-economic benefits, but pertains to decisions on tenure, apportionment, or other matters that are not within my authority to consider under section 8 of the *Forest Act*. Specifically, issues raised (see also above, Community dependence on the forest industry, and Other First Nations' issues) included concerns expressed by the two First Nations tribal councils, the CCRD, and an environmental group, over perceived inequities in the distribution of harvesting rights and revenues; the need to dedicate a supply of wood to local communities; the need for more value to be added to forest products locally before shipment; the need to develop income from sources other than logging; the small number of jobs associated with helicopter logging; the difficult socio-economic situation of local First Nations communities; and concerns related to First Nations' treaty settlements in the area.

In view of the general context of uncertainty over land use and management in this TSA, which I have discussed further in my 'Reasons for decision', I have conveyed to the Minister of Forests for his consideration, a number of concerns raised by First Nations' representatives in meetings with me in July 1999, which were not within my authority to consider in this determination.

- (e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

### Unsalvaged losses

Unsalvaged losses are timber volumes destroyed or damaged by causes such as fire and disease that are not recovered through salvage operations. In regenerated forests, a number of parasites, fungi or plants can kill trees or degrade the quality and value of logs.

Estimates for unsalvaged losses account for epidemic (abnormal) infestations and for factors that result in losses that are not recovered through salvage harvest programs and are not recognized in yield estimates. Timber volume losses due to insects and diseases that normally affect stands (endemic losses) are accounted for in inventory sampling for existing timber yield estimation or through other methods. Losses associated with second-growth stands are addressed by application of operational adjustment factors (OAFs) as noted under *estimates for site productivity and regenerated stand volumes*.

The estimates of unsalvaged losses in the Mid Coast TSA used in the analysis were based on district records of events and subsequent salvage programs, and were as follows.

| Cause of loss | Annual unsalvaged loss<br>(cubic metres per year) |
|---------------|---|
| Fire          | 7102  |
| Windthrow     | 13 000  |
| Disease       | 0*  |
| <b>Total</b>  | <b>20 102</b>                                     |

- (\* Epidemic losses are approximately zero; endemic losses are included in growth and yield estimates.)

The total estimated annual unsalvaged volume losses were deducted from the timber supply forecast in the analysis.

Public input included comments from the CCRD that paperwork and the large size of the district prevent the timely salvage of damaged wood before deterioration, and that direct salvage awards should be made to facilitate timely recovery. I note that legislation has been changed recently to expedite salvage, but to the extent that this comment may be unavoidably true, this is why unsalvaged losses are identified and accounted for in projecting the timber supply. In the range identified—approximately two percent—these losses are within an acceptable average range for coastal areas. I therefore accept them as the best information currently available, and I am satisfied that they have been appropriately accounted for in the timber supply analysis for use in this determination.

## Reasons for Decision

In reaching my AAC determination for the Mid Coast TSA, I have considered all of the factors presented above, and I have reasoned as follows.

In recent years the mid coast area of British Columbia has become a focus for local and international, public and scientific interest. Many questions related to how, and to what extent, portions of its multiple natural resources can be responsibly managed to create social and economic benefit, and conversely, to what extent certain areas and ecosystems should be protected from human exploitation, are currently being investigated and discussed. What level of alteration in the remaining pristine watersheds in BC's old-growth coastal temperate rain forests is acceptable, in today's global context, to a well-informed public? Who should bear the—potentially substantial—costs of foregone social and economic opportunity, if these areas or parts of them are protected? What standard of certification is appropriately required of an industry operating in and selling products from this area? These questions and more have brought international interest to land use and forest management issues in the mid coast area. Many related questions are now being addressed by representatives of a range of public interests at the BC Central Coast Land and Coastal Resource Management Plan process. This process has been underway for two years and is expected to make recommendations to the provincial Cabinet later this year. Concurrently, certification initiatives for industry are underway, scientists are evaluating appropriate areas for permanent protection in the area, and First Nations are negotiating treaties with respect to claims of ownership of traditional lands.

These complex, interrelated issues have the potential to affect the availability of harvestable timber in the TSA in a number of ways—socially, economically and environmentally. These implications have prompted some interest groups to suggest that the only appropriate course in an AAC determination for the area at this time is to exercise a precautionary principle and reduce the allowable harvest until some of the major uncertainties are resolved. But this proposal itself raises several difficult questions. What level of reduction would constitute a reasonable recognition of the overall implications of the many factors currently at issue? Would setting the AAC at the projected long-term level be appropriate? What would be the long-term level from a changed contributing land base? For how long should any such AAC reduction remain in place? Who, besides licensees and forestry workers, should be expected to bear the costs of a reduced level of harvesting operations? And importantly, who, and on what basis, should assess the need for and legitimacy of the considerations leading to such a reduction, and the adequacy of the reduction itself?

Section 8 of the *Forest Act* authorizes me as chief forester to determine AACs based on a specified list of considerations which pertain predominantly to biophysical characteristics, but which also include the social and economic objectives of the Crown *as expressed by the Minister of Forests* (my emphasis). In my interpretation of the legislation, the authority provided to the chief forester under section 8 does not extend so far as to permit his or her use of the section as a basis for anticipating, and for settling unilaterally on behalf of society, complex questions affected with extensive public interest in many forms unrelated to the specific considerations identified in that section, or to contemplate broad social and economic issues beyond those expressed for the province by the minister. For this reason I have not considered it appropriate to use this determination as a means to reduce the AAC to any extent that would be inconsistent with either my consideration of biophysical factors or the currently expressed social and economic objectives for the province.

Nevertheless, in my considerations above I have recognized many unresolved land use issues with which the district manager must contend in the process of approving cutting permits—issues that limit and confine the areas in the TSA that are suitable and available for harvesting, and within which he must administer the AAC I shall determine. I have consequently recommended that if at any time the district manager finds the AAC I determine impossible to administer within the available area without compromise to other forest management objectives, he may wish to consider requesting government to specify certain areas within the TSA as designated areas under Part 13 of the *Forest Act*, upon which basis a temporary AAC reduction could then be applied. In my judgement, government is more properly able to assess and represent the broad spectrum of public interest upon which such a designation must be based than is the chief forester acting within the more specifically prescribed authority provided by section 8 of the *Forest Act*. Alternatively, as I have noted, the application of section 61 of the *Forest Act*, which concerns matters outside my jurisdiction, could also be contemplated.

On this basis I have proceeded in accordance with the requirement of the *Forest Act* to determine an AAC for the area, based on the considerations identified in section 8. I recognize that some of the many factors currently bearing on land use and management in the Mid Coast TSA may well be resolved and exert definable impacts on the timber supply well before the statutorily required date for the next AAC determination. In the event of such resolution, I shall review the timber supply and, if necessary, determine a new AAC at an earlier date than required by the statute.

It is on the basis of these understandings, and in accordance with the considerations presented throughout this document, that I have reasoned and have reached my AAC determination for this TSA as follows.

The 'Preferred reference' timber supply forecast, selected for reference in this determination for the reasons discussed in detail in Timber supply analysis and reference forecast, incorporated steady contributions of 59 000 cubic metres per year from outer coast stands, and 178 000 cubic metres per year from areas outside conventional operating areas. In this projection the current AAC of one million cubic metres could be maintained for two decades, followed by declines of roughly 10 percent in each of four subsequent decades, to a steady long-term level of 730 000 cubic metres per year.

In determining AACs, my considerations typically identify factors which, considered separately, indicate that the timber supply may actually be either greater or less than that projected in the reference or 'base case' forecast. Some of these factors can be quantified and their impacts assessed with some reliability. Others may influence timber supply by introducing an element of risk or uncertainty to the decision, but cannot be reliably quantified at the time of determination. These latter factors are accounted for in determinations in more general terms.

The following factors have been identified in my considerations as reasons why the timber supply projected in the reference forecast may have been underestimated to degrees that may be quantified:

- *Recreation mapping:* The re-introduction of 9400 hectares excluded from the timber harvesting land base is necessary to remedy errors in mapping and overlaps with other resource constraints. I must therefore account for an underestimation of this size in the timber harvesting land base used as a basis for the 'Preferred reference' forecast. The CCLRMP process will no doubt assist greatly in defining the extent of the recreation resource for the next analysis and AAC determination.



- *Genetically improved seed stock:* I have accepted that the use of Class A seed, which was not accounted for in the analysis, will increase regenerated stand volumes and result in an overall increase to the *long-term* timber supply of 0.88-percent over that projected in the 'Preferred reference' forecast.

The following factor has been identified in my considerations as a reason why the timber supply projected in the reference forecast may have been underestimated to a degree that may not be readily quantified:

- *Site index/regenerated stand volumes:* From the best currently available information I have concluded that when appropriate old growth site index (OGSI) adjustments are determined and applied, the timber supply in the Mid Coast TSA will likely prove to be significantly more stable than projected in the 'Preferred reference' forecast. At this time, for the reasons given in my considerations under *estimates for site productivity and regenerated stand volumes*, I have not accepted the non-declining harvest level of 1.2 million cubic metres projected in the sensitivity analysis as a valid projection for the TSA. However, pending the acquisition of statistically reliable data, I do accept the potential for a large but currently unquantified addition to the projected timber supply from appropriate revisions to OGSI estimates.

I have identified the following factors as indicative of potential overestimations in the timber supply to degrees that may be quantified with some reliability:

- *Operability:* On the basis of personal aerial reconnaissance, corroborated by the Mid Coast Forest District Manager and senior staff, the operable area in the vicinity of Jump-Across, Swallow, and Nusash creeks should be reduced by something less than 3500 hectares; to reflect the restriction of the accessibility of the three identified drainages to only small amounts of helicopter harvesting.
- *Identified Wildlife Management Strategy:* Because the timber supply analysis was undertaken before the announcement of the IWMS, no explicit accounting was made for the management of identified species. While it is too early to speculate on the total habitat area that will be required to implement the IWMS, or on how much of this area will lie within the current timber harvesting land base, wildlife habitat areas have not yet been declared, and with the high level of occurrence of identified species in the TSA, it is likely that habitat provision additional to that afforded by other strategies will be required and that this could constrain the timber supply. Consistent with provincial policy I am accounting for a one-percent overestimation in the timber harvesting land base used to project the 'Preferred reference' forecast.

I have identified the following factor as indicative of a potential overestimation of the timber supply to a degree that currently may not be quantified with accuracy:

- *Unmerchantable/low-productivity stands:* Hemlock-balsam stands of poor and low productivity cover approximately one-third of the timber harvesting land base used to project the 'Preferred reference' forecast. Since these stands support lower-than-average volumes on the timber harvesting land base, their contribution to the total timber supply would be somewhat less than one third. Nevertheless, in recent years they have contributed only 3.5 percent of the harvested volume (outside conventional areas). This very low level of harvesting must increase significantly to avoid the possibility of up to a thirty-percent overestimation in the timber harvesting land base and associated future disruptions in the projected timber supply.

I must also account for a reduction in volume of 2000 cubic metres associated with the removal of 360 hectares from the timber harvesting land base for the creation of a woodlot licence, the AAC for which is administered separately under the *Forest Act*.

From reviewing all of my considerations documented above, including the above list of factors identifying under- and overestimations in the projected timber supply, I have reasoned and concluded as follows.

The range of alternative projections provided by the timber supply analysis report for my consideration as reference forecasts was most helpful in my assessment of the reasonability of differing levels of contribution from the various components of the projected timber supply. The probability of ongoing, large, periodic fluctuations in the economic availability of timber for harvest from non-conventional and outer-coast stands has persuaded me of the inappropriateness of determining an AAC based on any timber supply projection that assumes predominant contributions from these components of the harvest over extended periods of time, as is the case in the both the 'Initial' and 'revised operability' forecasts. Operations in hypermaritime areas are relatively new and unproven on the scale assumed in these two forecasts. Likewise, while in recent years the use of non-conventional systems including helicopters has become more widespread in the TSA, the current and foreseeable economic climates preclude a reasonable expectation that these means could become—and could continue to represent—the major methods of harvesting in the TSA for decades at a time.

From this I have concluded that the most reasonable of forecasts is that which assumes contributions from non-conventional and outer coast areas at constant levels that can be sustained throughout the long term. This principle is incorporated in the 'Preferred reference' forecast, which indicates that the timber supply is expected to begin to decline from the present level in about two decades, before any consideration is given to the combined implications of the factors identified above, which I will address next, or to any land use changes that may result from the CCLCRMP process, to which I will again refer below.

Of the three factors identified above indicating possible overestimations in the harvest level projected in the 'Preferred reference' forecast, the most significant is the need to remove from the timber harvesting land base something less than 3500 hectares—nearly 2 percent—in respect of the inaccessibility of three drainages in the Jump-Across, Swallow and Nusash areas. The next significant factor is the implementation of the IWMS which, consistent with provincial policy, I have anticipated will constrain the land base by a further one percent. The need to increase the harvest contribution from hemlock-balsam stands of poor and low productivity is required to avoid a potentially significant threat to the projected economic timber supply in the mid and long terms. However, if their use is not increased, the implications for the *short term only* are not significant, particularly since the projected initial harvest level would remain achievable even if half the low-productivity stands in the timber harvesting land base were excluded from contributing. Thus the resulting overall combined constraint from these considerations in the short term—i.e. from removing most of the Jump-Across creek area and additional habitat for the IWMS—amounts to something less than 3 percent of the timber harvesting land base.

On the other hand, the 9400 hectares mistakenly assumed to be required to be removed to meet objectives for recreation management represent over 5 percent of the timber harvesting land base. Returning the foregone contribution from this area to the timber supply will alone outweigh the combined constraint from the two above-identified factors by a substantial margin.

At this point, the overall result of my considerations—before addressing the several notable outstanding factors discussed below—is an indication that the timber supply is in fact more stable than projected in the 'Preferred reference' forecast, and that I have identified no risk in setting a harvest level consistent with the initial level in that projection. This conclusion is supported even without any assumed enhancement of the projected supply resulting from adjustments to site indexes for regenerated stands in respect of information from OGSI studies, pending collection of statistically valid data from appropriate areas within the TSA itself. As I have noted, in my experience it is likely this information will lead to an increase in the projected timber supply in the TSA, and that this will further validate the ability of the TSA to support a harvest level established at this time at the initial level projected in the 'Preferred reference' forecast. It may well augment the projected supply such that, all other considerations remaining equal, the duration of the attainability of the current harvest level may be extended. It may also provide flexibility to accommodate potential changes to growth and yield predictions based on increased implementation of alternative silviculture systems in the TSA, as well as possible additional land base requirements for archaeological or other cultural heritage resource values. At this time, however, neither of these conclusions is certain, nor is either one required as a validating factor for my current determination.

From all the foregoing, I have determined that the harvest level of one million cubic metres, as projected in the 'Preferred reference' forecast, can be attained while meeting all the management objectives and requirements of the Code as modelled to my satisfaction in the timber supply analysis, at least for the duration of the period of effectiveness of the AAC. This harvest level must include both the AAC for the TSA and the 2000-cubic-metre annual harvest level for the already issued woodlot; the AAC for the TSA must therefore be reduced by 2000 cubic metres.

Also, as discussed in 'Partitioned component of the harvest', I have decided, in order to avoid the potential for a progressive decline in the availability of economically accessible timber, to specify a partition of 200 000 cubic metres of the AAC for the TSA as harvestable only from hemlock-balsam stands of poor and low site productivity. Since the contributions of the poor and low site classes to the timber supply are roughly equal, it is necessary that the administration of the partition provides for harvesting from sites of both poor and low productivity, and thereby provides evidence with respect to the economic viability of the sites and their appropriate inclusion in the timber harvesting land base.

Finally, the AAC I have determined is dependent and conditional upon the ongoing maintenance of harvest contributions at the sustainable levels of 59 000 cubic metres from outer coast areas, and 178 000 cubic metres from non-conventional areas. It should be clarified that the amounts harvested under the 200 000 cubic metre partition may overlap with either of these latter contributions. I expect district staff to closely monitor and ensure the appropriate levels of harvesting in each of these categories, including the partition, and if necessary the contributing land base will be adjusted accordingly for the next AAC determination.

## **Determination**

Having considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided, it is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, and that reflects current management practices as well as the socio-economic objectives of the Crown, can be best achieved in the Mid Coast TSA at this time by establishing an AAC of 998 000 cubic metres. This maintains the current harvest level for the area including the issued woodlot licence volume of 2000 cubic metres, and reduces the AAC for the TSA by 0.2 percent.

Within the AAC of 998 000 cubic metres, a partition of 200 000 cubic metres is specified as attributable to hemlock-balsam stands on sites of poor and low productivity, as discussed above in 'Partitioned component of the AAC'.

The following two observations are also important to, and form integral parts of this determination.

First, as I have noted in my 'Reasons for decision' and in earlier sections of this document, there are a number of significant outstanding land-use issues of a broad social nature which require resolution before their implications can be reflected in an AAC determination. When formal decisions by government are pending, I do not attempt to reflect the potential timber supply implications of their possible but uncertain outcomes in determinations under section 8 of the *Forest Act*. Instead I have recommended that, if necessary, the district manager pursue the option of requesting Cabinet to specify certain areas as designated areas under Part 13 of the *Forest Act*, in respect of which a temporary AAC reduction may be applied. Alternatively, application of section 61 of the *Forest Act*, by the minister with the consent of licensees, could be contemplated.

Second, I have noted that if resolutions to significant land use issues are reached at an early juncture, and if consequent substantial timber supply implications are indicated, I will, if appropriate, determine this AAC again at an earlier date than required by statute.

This determination is effective June 1, 2000, and will remain in effect until a new AAC is determined, which must take place within five years of the effective date of this determination.

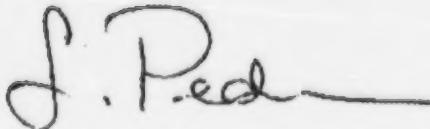
## Implementation

In the period following this decision and leading to the subsequent determination, I encourage BCFS staff to undertake the tasks and studies noted below that I have also mentioned in the appropriate sections of this rationale document. I recognize that the ability of staff to undertake these projects is dependent on available staff resource time and funding. These projects are, however, important in helping to reduce the risk and uncertainty associated with key factors that affect the timber supply in the TSA.

- District staff should carefully monitor the utilization of marginally economic stands, including hemlock-balsam stands on sites of poor and low productivity as specified in the partition of the AAC, as well as outer coast stands, and non-conventional harvest.
- District staff should establish some measurable economic criteria in order to develop a more refined understanding of the complex issue of an appropriate contribution of marginally economic stands, for use in the next analysis.
- If funding permits, a second phase of the inventory audit should be carried out, with emphasis on collecting data to resolve questions about the volume estimates for existing natural stands for the operable land base in the outer and inner coast areas.
- District staff should pursue funding for site productivity studies to assess the appropriate adjustments to incorporate in future timber supply analyses.



- The BCFS Research Branch is currently examining and reviewing expected productivity changes at varying levels of retention. It will be important to combine the emerging information with an assessment by district staff of the expected use of these systems, the extent of the areas affected, the amounts of expected retention, and the frequency of harvesting entries, for incorporation in the next timber supply analysis for the Mid Coast TSA.
- The recreation inventory should be verified for consistency of information between the component parts and to ensure all exclusions are valid and all overlaps are accounted for. Errors identified in the inventory as part of this process should be corrected. It should be ensured that the interpretation of the inventory for strategic planning purposes including timber supply reviews is consistent and logical.
- District staff should conduct an in-depth operability review prior to the next determination. This should include consideration of the criteria for the categories in the partition as well as the conventional land base.
- If funding permits district staff in conjunction with region and branch should conduct detailed terrain mapping to replace the ESA netdown for soils prior to the next timber supply review.

A handwritten signature in dark ink, appearing to read 'L. Pedersen', followed by a horizontal line extending to the right.

Larry Pedersen  
Chief Forester

March 15, 2000

## Appendix 1: Section 8 of the *Forest Act*

Section 8 of the Forest Act, Revised Statutes of British Columbia 1999, reads as follows:

### Allowable annual cut

8. (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for
  - (a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest areas and woodlot licence areas, and
  - (b) each tree farm licence area.

- (2) If the minister

- (a) makes an order under section 7 (b) respecting a timber supply area, or
  - (b) amends or enters into a tree farm licence to accomplish the result set out under section 39 (1) (a) to (d),

the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area

- (c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and
  - (d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.

- (3) If

- (a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and
  - (b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

- (4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).
- (5) In determining an allowable annual cut under subsection (1) the chief forester may specify portions of the allowable annual cut attributable to
  - (a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area, and
  - (b) different types of timber and terrain in different parts of private land within a tree farm licence area.
  - (c) [Repealed 1999-10-1.]
- (6) The regional manager or district manager must determine a volume of timber to be harvested from each woodlot licence area during each year or other period of the term of the woodlot licence, according to the licence.

- (7) The regional manager or the regional manager's designate must determine a volume of timber to be harvested from each community forest agreement area during each year or other period, in accordance with
- (a) the community forest agreement, and
  - (b) any directions of the chief forester.
- (8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider
- (a) the rate of timber production that may be sustained on the area, taking into account
    - (i) the composition of the forest and its expected rate of growth on the area,
    - (ii) the expected time that it will take the forest to become re-established on the area following denudation,
    - (iii) silviculture treatments to be applied to the area,
    - (iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,
    - (v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and
    - (vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,
  - (b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,
  - (c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,
  - (d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and
  - (e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

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## **Appendix 2: Section 4 of the *Ministry of Forests Act***

Section 4 of the *Ministry of Forests Act* (consolidated 1988) reads as follows:

### **Purposes and functions of ministry**

4. The purposes and functions of the ministry are, under the direction of the minister, to
- (a) encourage maximum productivity of the forest and range resources in British Columbia;
  - (b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;
  - (c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the government and with the private sector;
  - (d) encourage a vigorous, efficient and world competitive timber processing industry in British Columbia; and
  - (e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

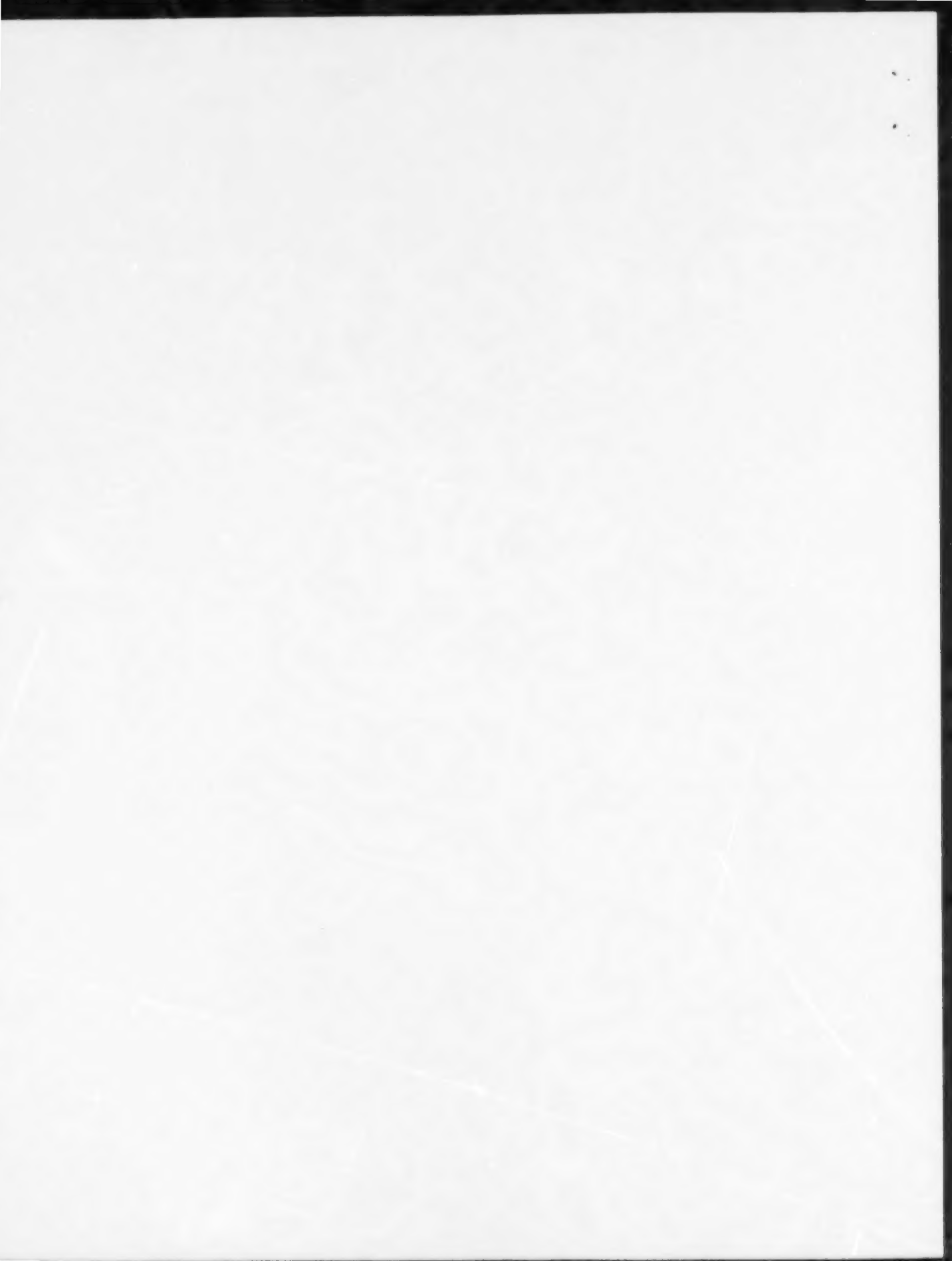
### **Documents attached:**

**Appendix 3: Minister of Forests' letter of July 28, 1994**

**Appendix 4: Minister of Forests' memo of February 26, 1996**

**Appendix 5: Summary of Public Information**





# **Mid Coast Timber Supply Area Timber Supply Review**

## **Summary of Public Input**

B.C. Ministry of Forests  
Mid Coast Forest District  
Box 190, Sawmill Road  
Hagensborg, B.C.  
V0T 1H0

**March, 2000**

This is a summary of the public input received on the Timber Supply Review in the Mid Coast Timber Supply Area. This summary does not assess the feasibility or validity of the input or whether it relates to the clearly defined mandate of the chief forester in the allowable annual cut determination.



# Mid Coast Timber Supply Area

## Background

As part of the review of timber supply in the Mid Coast Timber Supply Area (TSA), two opportunities were provided for public input. The first followed release of the Mid Coast TSA Data Package and Information Report in April 1998. The Information Report was a non-technical summary of the draft data and management assumptions that were to be applied in reviewing the timber supply for the Mid Coast TSA. A 30-day review period, ending June 1, 1998, was provided for the public to comment on these documents.

In June 1999, the B.C. Forest Service released the 1999 Mid Coast TSA Analysis Report and Public Discussion Paper. The public was encouraged to review and comment on the accuracy of the information in these documents and to provide additional information during the 60-day review period that ended August 6, 1999.

This report summarizes the input received during both public review periods. This information was provided to the chief forester for his consideration when he reviewed the allowable annual cut (AAC) for the Mid Coast TSA. The first section of this summary outlines the public review process implemented by the Forest Service, and describes the types of public input received. The second section summarizes the public input in sufficient detail to indicate the range of input received. The original submissions (with personal identifiers removed in accordance with the *Freedom of Information and Protection of Privacy Act*) can be reviewed at the Mid Coast Forest District office.

## Public Review Process and Response

Mid Coast District staff actively solicited public input on the Timber Supply Review in the Mid Coast TSA through the following actions:

- direct mail-out of 49 copies of the Information Report and/or Data Package and 66 copies of the 1999 Analysis Report and/or Public Discussion Paper to forest licensees, small businesses, government agencies, local governments, First Nations, public interest groups and individuals.
- the Information Report, Data Package, 1999 Analysis Report and Public Discussion Paper were available at the district office in Bella Coola and the regional office in Nanaimo.
- meetings regarding both the Data Package and Analysis Report were held with representatives from First Nations and the forest industry.
- local and regional media were provided with news releases to encourage articles on the Timber Supply Review.

As Table 1 shows, more than 45 individuals attended information sessions and open houses. The Mid Coast Forest District also received eight written submissions on the *Data Package* and five submissions on the *Analysis Report* (see Appendix 1).

| Activity<br>(No. of participants)            | Date                        |
|--|-----------------------------|
| <b>Information sessions</b>                  |                             |
| <b><u>Forest industry</u></b>                |                             |
| Interfor (teleconference) (16)               | Aug. 24, 1999               |
| Heiltsuk Tribal Council<br>(10)              | May 1998 &<br>July 15, 1999 |
| Oweekeno, Nuxalk, Kitasoo Tribal Council (9) | July 16, 1999               |

*Continued*



## Mid Coast Timber Supply Area

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| Activity<br>(No. of participants) | Date         |
|-----------------------------------|--------------|
| <b>Public meeting</b>             |              |
| Cedar Inn, Bella Coola (15)       | May 27, 1998 |
| Bay Hotel, Hagensborg (11)        | July 5, 1999 |

*Table 1: Participation in public information activities*

### Public Input

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In this section, public input on the information presented in the Timber Supply Review documents for the Mid Coast TSA is summarized under the following headings:

- Data Package (and Information Report)
- Timber Supply Area Analysis Report (and Public Discussion Paper)
- Other comments

### Data Package

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#### Land Base Factors

Three forest industry submissions question the criteria used to define the land base available for helicopter logging, saying the criteria are conservative and don't reflect current practice. In particular, these submissions point out that hemlock and balsam stands form a major component of the volume that has been and will continue to be harvested by helicopter, and suggest the criteria to define heli-logging areas should reflect this. For example, an Interfor submission says that company has logged and plans to log several hemlock-leading areas with volumes below 500 cubic metres per hectare.

Since operability is strongly influenced by market conditions, Western Forest Products proposes the use of three operability classifications: operable during below average market conditions; operable during average market conditions; and operable during above average market conditions.

One Interfor submission recommends a sensitivity analysis for the Outer Coast area to determine the increased area available for harvest if thresholds changed to 400 cubic metres per hectare for hemlock/balsam stands and 375 cubic metres per hectare for cedar and cypress stands which have a higher economic value.

An individual submission says no harvesting should occur in intact valleys until decisions about their future are made, including park creation, native land claims, wildlife habitat and tourism potential. This submission also expresses support for the creation of more parks such as the proposed Spirit Bear Conservation Area and Great Bear Rainforest.

An Interfor submission maintains that the netdown of 7.6 per cent from the timber harvesting land base to account for roads, trails and landings is too high. The company says research by the Ministry of Forests shows that the productivity loss is on average only half the area of actual site degradation, due to tree canopy closure over roads and trails. In addition, Interfor notes the 7.6 per cent netdown does not account for the increasing amount of helicopter logging, which requires fewer roads. Interfor says a netdown of four per cent is appropriate for the Mid Coast TSA.

#### Forest Inventory Factors

An Interfor submission says the large amount of current old growth in this TSA dictates that the new adjusted site indices be used in the base case harvest forecast.

The economic development officer for the Central Coast Regional District notes that over the past 20 years harvesting has been concentrated in large stands of the preferred species growing primarily on better and more accessible sites. The species mix has been eroded, according to this submission, and now hemlock-balsam and old-growth cedar predominate.

# Mid Coast Timber Supply Area

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## Expected Rate of Growth and Productivity

Interfor is of the opinion that since planting has been underway in the Mid Coast TSA since the mid-1970s, managed stand yield tables should be applied to Douglas-fir (age class 1 and 2), hemlock/balsam (age class 1) and cedar (age class 1).

The regional district submission says the expected rate of growth is based on flawed assumptions, as follows. First, there is no commitment to silviculture (beyond free-to-grow) in this TSA, so assuming growth on best site conditions is inaccurate. Second, young second-growth forests will not become targets for a second harvest because they will not be economic to heli-log or to justify reactivation of roads. Third, Forest Renewal BC funds are being managed by major licensees and their interests will be given priority (e.g., best sites, closest to current facilities and markets).

## Minimum Harvestable Age

An Interfor submission recommends that the minimum harvestable age for all species be the age at which the estimated growth rate is within five per cent of the maximum annual growth rate (culmination age). The company says this is consistent with the approach used in other TSAs (Fraser, So0 and North Coast). Piece size (the 30 centimetre minimum diameter) should be a secondary objective, according to Interfor.

## Regeneration Delay

An Interfor submission says the regeneration delay for hemlock/balsam on good and medium sites should be reduced to two years since these sites will be fully planted.

## Wildlife

An individual submission notes that the Mid Coast TSA contains most of the last, largest, untouched watersheds in B.C. with the last and largest populations of grizzly, black and Kermode bears. This individual says increased access will increase hunting and poaching of bears, and other species will also be endangered

by harvesting.

Interfor says the company was unaware a Deer Management Plan was being developed or that specific requirements for deer were needed. Until licensees are given an opportunity for input, Interfor says the proposed plan cannot be considered current practice and cannot be included in this timber supply review.

Interfor is also of the opinion that wildlife tree patches are unnecessary in this TSA because of the large amount of inoperable area and riparian reserves and management areas. The regional district submission says constraints to protect and maintain fish and wildlife habitat is a key consideration in this TSA and must apply to denning areas and summer and winter ranges.

## Environmentally Sensitive Areas

Two forest industry submissions express concerns about reductions to the land base to account for environmentally sensitive areas, particularly soil-related sensitivity. Interfor and Western Forest Products say the 90 per cent netdown for steep areas should be reduced because it underestimates the land base that could be available for helicopter logging. A second Interfor submission requests the Ministry of Forests undertake a study to verify the netdowns for soils similar to one done in TFL 38 that resulted in significant reductions in netdowns.

Interfor also requests information on how much area is contained within areas designated as environmentally sensitive for recreation.

## Non-Recoverable Losses

The regional district submission expresses the opinion that until proper utilization standards are enforced, waste billing will increase as it will be cheaper to pay for waste than attempt to utilize it. The regional district provides recommendations to improve utilization of waste wood.

# Mid Coast Timber Supply Area

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## First Nations

In its submission, the Heiltsuk Tribal Council maintains the Crown has not fulfilled its fiduciary responsibility to the Heiltsuk, to ensure their aboriginal rights are protected and given expression.

## Socio-Economic Factors

The regional district submission makes extensive comments on this topic. Some of the key points are as follows:

- timber harvesting should not be constrained because of other unregulated activities such as mushroom picking, botanical forest products, etc. Without regulation, these activities provide no direct economic benefit to the Crown.
- it is wrong to assume that continuing to export 40-year-old logs from the Mid Coast TSA will provide meaningful, well-paid family employment.
- while the rate of heli-logging has increased by 200 per cent, only about 10 jobs have been created.
- there is no long-term vision for product development or marketing of existing stands.

The regional district submission identifies many reasons why socio-economic objectives for the region and the province cannot be met, and proposes several solutions. The regional district believes that without drastic change, the Mid Coast TSA will continue to experience severe hardship, loss of residents, reduced community income, loss of students, higher than average welfare rolls and greater social problems.

An individual submission says jobs can be created while harvesting less wood by encouraging small businesses engaged in value-added activities (including non-traditional forest uses) and selective harvesting. The Ocean Falls Citizen Committee says the central coast has a rapidly expanding human population that will

require employment. The committee suggests dedication of an ongoing supply of wood to communities (through community forest licenses or other management structure).

## Timber Supply Area Analysis Report

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### Expected Rate of Growth and Volume Estimates

The regional district submission advises caution regarding growth projections for second-growth forests and says a culmination age of 40 years is not workable due to the lack of commitment to silviculture in this TSA. The regional district also notes a need for better productivity information for cedar on the Outer Coast, prior to setting a harvest level.

### Land Base Factors

Interfor expresses its support for inclusion of new areas suitable for helicopter logging in the timber harvesting land base and in general agrees with the criteria used to select these areas. The company's submission says the long-term forecast for helicopter logging over the next 50 years is reasonable, as is the use of the revised operability harvest forecast. Little Valley Forest Products says the timber supply analysis's conservative forecasts and skepticism regarding future harvesting of marginal timber types are well-founded, based on past performance.

The Sierra Club of BC says increases in heli-logging areas and the inclusion of large areas of low and poor productivity sites are not substantiated by historical harvest patterns or current economic projections. The club's submission cites recent Ministry of Forests figures that indicate it is uneconomic to log on 70 per cent of the central coast. The Sierra Club recommends that the contribution of these marginal stands be limited to the long-term timber supply (as discussed on page 38 of the *Analysis Report*) and that a conservative estimate of volumes be used. The club says the patchy nature of these forests plus the lack of

## Mid Coast Timber Supply Area

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spatial modelling in this timber supply analysis is further reason why inclusion of these marginal sites is questionable.

Interfor expresses support for a partition of the harvest if it results in enhanced access to heli-logging areas. Interfor notes that study areas and the temporary deferral of other operating areas are affecting their business plan in the Mid Coast TSA, and encourages the government to bring the Central Coast protected areas process to a speedy conclusion.

The Sierra Club says it can reasonably be expected that the internationally recognized conservation values of this area will result in relatively large areas of land being set aside for purposes other than timber production, and this should be reflected in this timber supply review.

### Biodiversity

In its submission, Interfor says it is inappropriate to model constraints on harvesting in order to meet older-forest habitat requirements. The company says the availability of suitable habitat outside the timber harvesting land base makes retention of older forests on the operating land base unnecessary.

The Sierra Club says the important social and ecological values of healthy ecosystems are largely ignored in the timber supply analysis. Their submission says the Forest Practices Code does not protect areas of concentrated biodiversity (especially riparian areas) due to the preponderance of old, but not necessarily ecologically critical, forest types outside the timber harvesting land base. The club cites continued overcutting, the ongoing conversion of old growth forests into plantations and the concentration of harvesting in valley bottoms as evidence that international commitments to the protection of biodiversity are being undermined.

### Socio-Economic Factors

The regional district submission notes that while many First Nations are dependent on the fishing industry, non-native communities are tied to the economy of forestry, as well as tourism and government. The regional district says many individuals rely on the social safety net and forestry self-employment is declining due to problems with the Small Business Forest Enterprise Program.

The regional district submission provides a variety of data documenting negative changes in the local forest-based economy. One example is a loss of \$2 million per year in wages due to lay-offs, transfers and reduced harvesting by Interfor, the largest employer of local residents. The regional district says forestry-related employment dropped by 25 per cent from 1986 to 1991, and dropped again in 1998 by 15 per cent.

In general the regional district says the socio-economic analysis is very soft, doesn't reflect the predicaments of local communities and shows a lack of sensitivity to the crisis situation in the Mid Coast TSA.

The Sierra Club makes several comments on the socio-economic aspects of the timber supply analysis:

- the economic contribution of non-timber forest values is not considered in the analysis.
- local economic development and local communities will not benefit from maintaining a high rate of harvesting, since the fibre is processed outside the Mid Coast TSA.
- the long-term economic options within local communities are undermined by the ongoing conversion of old growth stands to short rotation plantations and by the continuing practice of high-grading (evident from a comparison between the natural species profile and the harvested volumes by species).



# Mid Coast Timber Supply Area

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## Other Comments

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Many submissions commented on factors or issues other than those specifically covered by Timber Supply Review documents. These comments are summarized in this section.

### Timber Supply Review Process

The Heiltsuk Tribal Council submission says they have not been consulted and informed as required by recent court cases, noting that the Heiltsuk Nation represent at least 70 per cent of the population in the TSA. The Council requests a meeting with the Ministry of Forests to discuss their concerns.

The Ocean Falls Citizen Committee says that while they are concerned about various issues (visual quality, tenures, careless treatment of red alder, large clearcuts, access management, tourism values), they don't have the resources to respond in detail. The committee suggests a review of timber supply should be accompanied by an analysis of demand, market trends, etc. They say how the timber supply is managed is very important, but why it is managed and for what objectives is even more important.

Interfor expresses concern about the application of sensitivity analyses in the timber supply analysis. The company says sensitivity analyses are useful to test different scenarios but, used for modelling purposes, they can lead to inappropriate conclusions when applied to operating conditions.

The Sierra Club expresses concern that no sensitivity analysis was conducted on the aggregated effects of various assumptions (i.e., a worst case scenario). The club says this puts communities at risk in the short and long term.

### Forest Tenures and Apportionment

The Heiltsuk Tribal Council submission notes that under current plans, virtually all timber in the Mid Coast TSA is allocated to third parties. The Council says the Heiltsuk people have not been given the opportunity, as directed by the Supreme Court in Delgamuukw, to participate in

resource development within their traditional territory.

Durfeld Log Construction expresses the opinion that too much wood is held by too few, and that the huge potential of the logbuilding industry is stymied by the difficulty of accessing old-growth coastal cedar. The company says larger areas for selective logging must be identified and cutting rights awarded based on jobs created and value earned from the trees harvested.

Little Valley Forest Products says harvesting rights should be tied to employment levels and no job reductions by major licensees should occur without a corresponding downward adjustment in harvesting rights. The company says the partitioned cut and part of the Forest Reserve should be added to the existing Small Business Forest Enterprise Program and be available on a competitive basis to the value-added sector, community forestry, local community-based industry and First Nation forestry and manufacturing. Little Valley also proposes incentives that could be used to encourage licensees to work in the Outer Coast and to utilize height class 3 trees.

The Central Coast Regional District submission says timber licences are archaic forms of tenure that continue to make sustainable forestry and stabilization of the local workforce impossible. The regional district says companies utilizing the major part of the AAC must be financially sound, provide the greatest number of jobs per cubic metre, and have a long-term vision that includes a corporate or environmental ethic on the ground. The regional district is of the opinion that the chief forester has the ability to ensure that ethics, certification and solid products in high demand are achieved. The regional district submission also notes that the small business program allocation in the Mid Coast TSA is the smallest in the province (nine per cent of the AAC) and says a streamlined small business program is the only opportunity for successful forest sector

## Mid Coast Timber Supply Area

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development. The regional district says stumpage fees, high development costs and poor stands are currently barriers to success of the small business program.

### Harvest Levels

An individual submission says the current AAC is 81 per cent over the sustainable level and must be reduced to that level immediately. This individual says overcutting and clearcutting are detrimental to water quality, fish habitat, grizzly bear habitat, slope stability, etc.

Little Valley Forest Products says that with full operation of their new manufacturing plant, they intend to vigorously pursue harvesting of historically marginal forest types. The company urges the chief forester to increase the partitioned AAC from the current level of 130,000 cubic metres per year to 180,000.

A submission from the Ministry of Small Business, Tourism and Culture says, based on the information provided, they believe the appropriate AAC should be two-thirds to three-quarters of the current level. This submission says harvesting large volumes on the Outer Coast will harm scenic values, and yet will not have a positive effect on Crown revenues or forestry interests, due to the marginal economic value of this wood and the poor growing sites. The ministry also says a significant probable outcome of the Central Coast Land and Resource Management Plan is stronger regulations concerning visual management, particularly in the Outer Coast, yet this is not accounted for in the analysis.

The Central Coast Regional District submission says the AAC should not be determined until the following issues are resolved: protected areas, parks and special management zones; biodiversity provisions; grizzly bear and black-tailed deer winter range; visual quality objectives for the Discovery Coast and other contentious areas; and seral stage requirements. If it is not possible to wait, the

regional district says the AAC should be set at the long-run sustainable yield (770 000 cubic metres per year). This submission says a high AAC should not be fixed for five years due to a lack of information.

The Sierra Club says the Chief Forester must consider the effects of a transition from conventional clearcutting to variable-retention forestry resulting from changes in societal attitudes and the international marketplace. For example, the higher harvest costs associated with variable-retention methods may further limit the economic viability of many marginal sites. The club also says maintaining an unsustainable rate of cut (as well as overcutting, depletion of natural capital, loss of biodiversity and high-grading) will result in indefensible consequences to First Nations and local communities, contrary to the mandate of both the Chief Forester and the Crown. The Sierra Club also requests that this AAC determination be revisited after completion of the Central Coast Land and Resource Management Plan.

### First Nations

The Oweekeno-Kitasoo-Nuxalk Tribal Council does not accept the authority of the Chief Forester to determine an AAC for the area, expressing the desire to establish a sustainable harvest level for each of their traditional territories. They say past harvesting in the Bella Coola valley has left only marginally economic areas for harvest, and the current licensing structure directs benefits from harvesting in their traditional territories to the Lower Mainland area, with little or no perceived benefit to the primarily First Nations Mid Coast population. They therefore question the Crown's social and economic objectives for the area. The tribal council says the Mid Coast TSA harvest should be reduced immediately or over 10 years to 500,000 or 550,000 cubic metres to avoid drawing down the timber capital while treaty negotiations are underway.

## Mid Coast Timber Supply Area

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The Heiltsuk Tribal Council is concerned about the impact of the AAC on their traditional territory, and about the potential implications for First Nations treaties from future AACs that will be based on the Central Coast Land and Coastal Resources Planning process. They disagree with the Mid Coast socio-economic report.

Both Tribal Councils note the poverty and high unemployment levels (80 to 90 per cent) of First Nation members who reside in the Mid Coast TSA and indicate a strong interest in expanding their participation in the forest industry.

The Sierra Club expresses the opinion that continued alienation of lands and resources from traditional territories is unjust. Referring to the statement in the *Analysis Report* that in the next decade up to 90 per cent of harvesting will concentrate in good and medium productivity sites, the Club says this is essentially a resource grab by the Crown prior to the fair settlement of First Nations jurisdictional and land title issues.

### Management

An individual submission expresses the opinion that the Forest Practices Code is inadequate to protect B.C. forests, and asks that clearcutting be ended completely.

The submission from the Central Coast Regional District provides numerous critiques and recommendations regarding forest management in the Mid Coast TSA. Some of these include:

- take a cautious approach with small cedar on Outer Coast lowlands;
- discontinue heli-logging of inner coast preferred species at 50 cents per cubic metre; this reduces employment and revenue to the province and does not contribute to good management;
- companies should not be allowed to harvest without a solid financial plan; without that, they may high-grade to achieve short-term financial survival.

## **Submissions received by the Mid Coast Forest District**

### **Submissions received on the Data Package**

#### **First Nations**

Heiltsuk Tribal Council

#### **Local government**

Central Coast Regional District, Economic Development Commission

#### **Industry**

International Forest Products Ltd. (2)

Western Forest Products Ltd.

Durfeld Log Construction

#### **Interest groups**

Ocean Falls Citizen Committee

#### **General public**

One individual submission

### **Submissions received on the Analysis Report**

#### **Local government**

Central Coast Regional District, Economic Development Commission

#### **Government agencies**

Ministry of Tourism, Small Business and Culture (Tourism Policy and Land Use Branch)

#### **Industry**

International Forest Products Ltd.

Little Valley Forest Products Ltd.

#### **Interest groups**

Sierra Club of BC